EXH. MNL-3
DOCKETS UE-240004/UG-240005
2024 PSE GENERAL RATE CASE
WITNESS: MARK NEWTON LOWRY

BEFORE THE
WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION

WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION, **Complainant,** **v.** **PUGET SOUND ENERGY,** **Respondent.**	**Docket UE-240004** **Docket UG-240005**

SECOND EXHIBIT (NONCONFIDENTIAL) TO THE PREFILED DIRECT TESTIMONY OF

MARK NEWTON LOWRY

ON BEHALF OF PUGET SOUND ENERGY

FEBRUARY 15, 2024

Inflation Research for PSE

24 January 2024

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1. Introduction

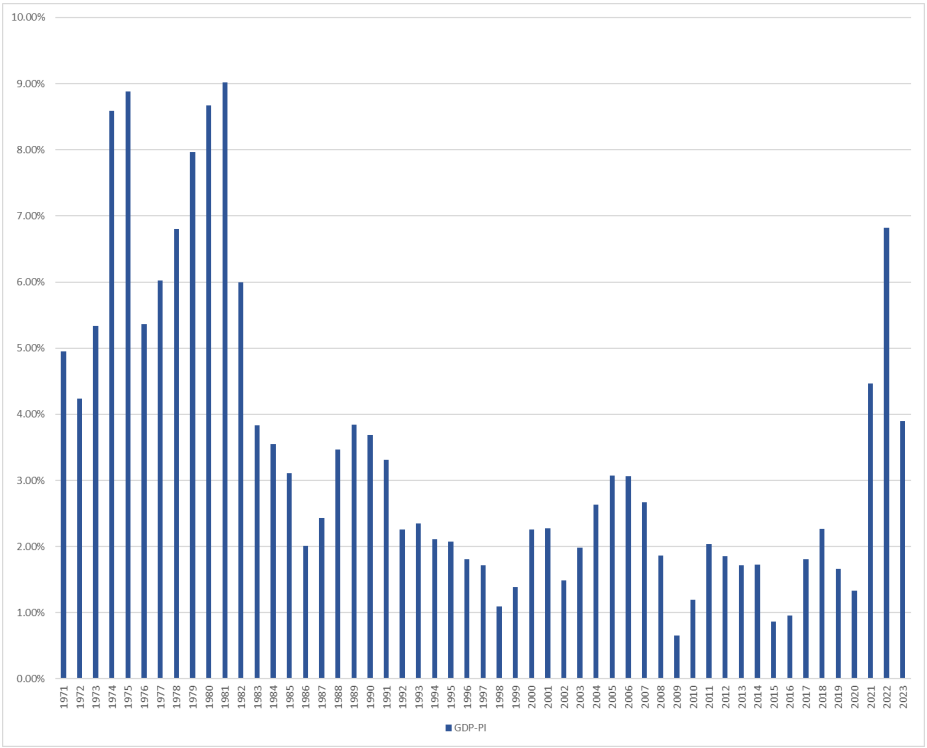
Washington gas and electric utilities are required by law to propose multiyear rate plans ("MYRPs") with their general rate cases. The permissible term of these plans is two to four years. Forward-looking cost projections are allowed in MYRP proposals. Input price inflation is an issue in making cost projections.

In January 2022, Puget Sound Energy ("PSE" or "the Company") filed a general rate case and MYRP application. In preparing that application, PSE assumed that prices of most base rate inputs it purchased would average 2.5% annual growth from midyear 2021. Inflation has substantially exceeded this rate from 2021 to the present due to the pandemic and other factors.

Figure 1 shows the inflation in the federal government's gross domestic product price index ("GDP-PI") from 1971 through the third quarter of 2023.[1] As is shown in Figure 1, GDP-PI inflation has in

Figure 1

History of GDP-PI Inflation



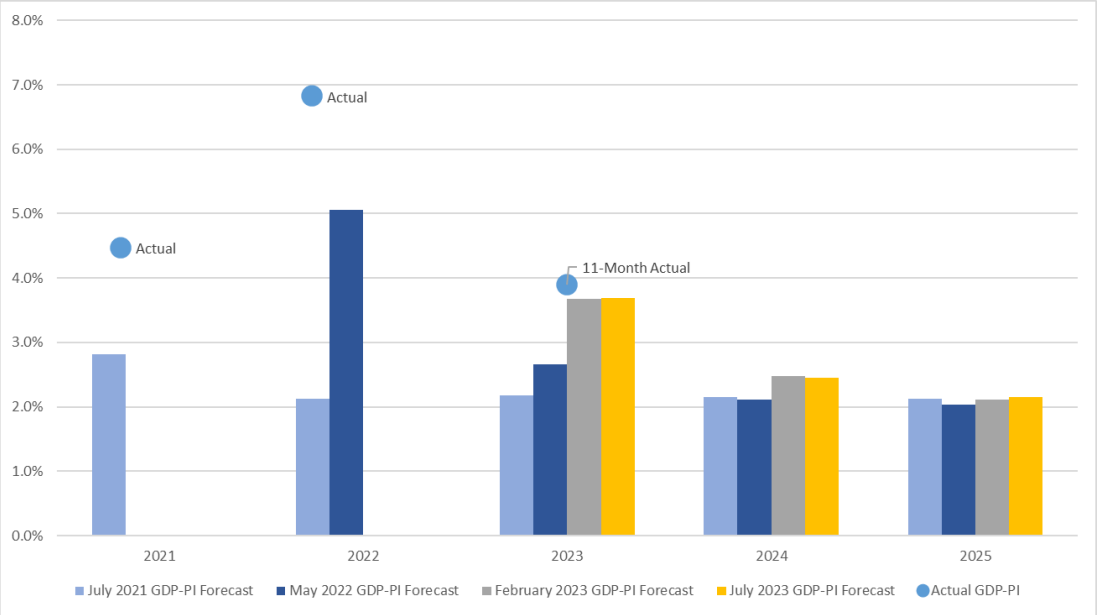
Source: U.S. Bureau of Economic Analysis, Table 1.5.4 Price Indexes for Gross Domestic Product, Expanded Detail (Last Revised on: December 21, 2023)

[1] This index is discussed further in Section 4.2.

the last three years reached its highest rates since the oil price shock of 1979-80. PSE was not alone in its underestimation of future inflation. Figure 2 shows how Congressional Budget Office ("CBO") forecasts of GDP-PI inflation differed from actuals in recent years. Evidently, CBO's forecasts of recent GDP-PI inflation have been well below actuals.

Figure 2

Forecasted and Actual GDP-PI Inflation Using CBO Forecasts

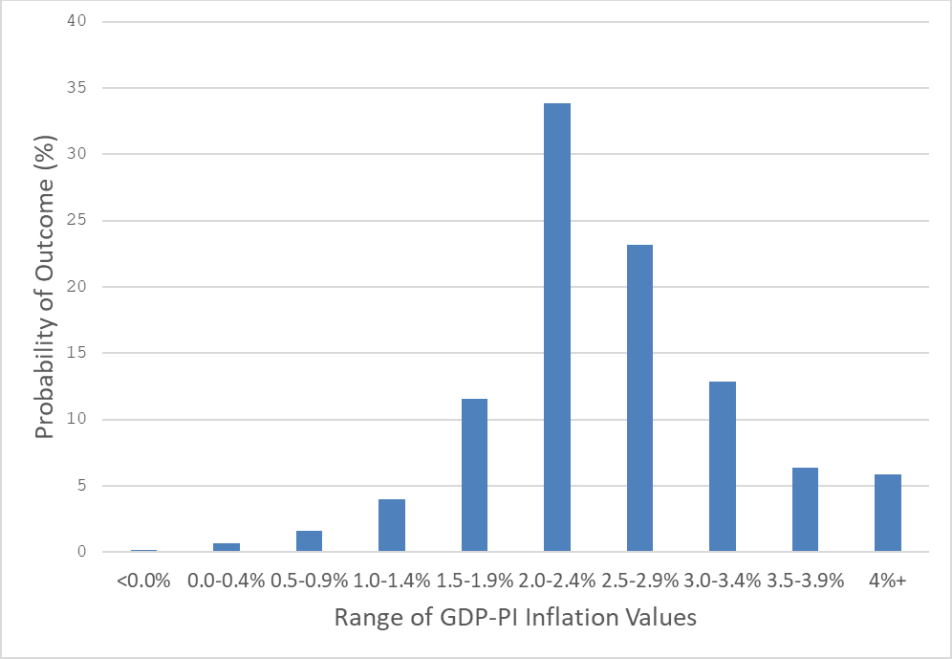


Sources: CBO 10-year Economic Projections and U.S. Bureau of Economic Analysis, Table 1.5.4

The Philadelphia Federal Reserve Bank's Survey of Professional Forecasters provides detailed quarterly predictions of macroeconomic inflation. Their predictions include point forecasts and probability forecasts. For the probability forecasts, each participant estimates the probability that inflation will fall within a given range. Figure 3 depicts the full range of forecasted probabilities for 2024 GDP-PI inflation according to the November 2023 survey. It can be seen that the professional forecasters believe there is a good chance that inflation will be much higher or much lower than the best guess forecast.

Figure 3

Aggregate Forecasted Probability of Each Range of Potential GDP-PI Inflation Outcomes This Year



PSE is filing a general rate case and MYRP proposal in February 2024. A five-year business plan will be presented as part of the MYRP that spans the years from 2024 to 2028. The test year for the rate case will be the twelve months ending June 30, 2023. The rate effective year will be calendar 2025 and the proposed two-year term of the MYRP will also include 2026. Inflation from June 2023 through calendar 2028 will thus be an issue in the MYRP proceeding.

As shown in Figure 1, inflation has slowed in 2023 but may materially exceed pre-pandemic norms in some or all years of the 2024-2026 period. There is, additionally, a real risk that inflation will differ materially from current expectations during these years. Key uncertainties include wars in Ukraine and the Middle East; fiscal, monetary, trade, and immigration policies of the U.S. government; and economic growth in China. Inflation could be higher or lower than expected.

It is therefore beneficial for PSE to use explicit and well-substantiated inflation assumptions in its revenue requirement projections. Price inflation research is frequently used in utility ratemaking. Such research can be integrated into utility cost forecasts and used to adjust such forecasts when new inflation information becomes available.

Pacific Economics Group Research, LLC ("PEG") is North America's leading expert on the use of index research in energy utility ratemaking. Our personnel have been active in the field for more than three decades. We have done research and prepared testimony using macroeconomic price indexes as well as utility construction cost and operation and maintenance ("O&M") input price indexes. PSE retained us to prepare price forecasts that the Company has used in its gas and electric revenue requirement forecasts.

In the next section we consider relevant theory supporting the use of inflation indexes to escalate revenue requirements. Precedents for using inflation indexes in ratemaking are then reviewed. There follows a discussion of our inflation research for PSE.

2. Theoretical Foundation for Using Index Research in Ratemaking

2.1 Basic Indexing Concepts

The cost of any type of input *j* that a utility uses in year *t* is the product of its price and quantity.

$$Cost_{j,t} = Input\ Quantity_{j,t} \times Input\ Price_{j,t}. \quad [1]$$

The growth (rate) of such a cost is the sum of the growth of the price and the quantity.[2]

$$growth\ Cost_{j,t} = growth\ Input\ Quantity_{j,t} + growth\ Input\ Price_{j,t}. \quad [2]$$

Since, additionally, inflation can be brisk and vary widely from year to year, input price inflation can have a major impact on future utility revenue requirements.

The aggregate cost of several kinds of inputs in year *t* is, analogously, the product of a summary input quantity index ("*Input Quantities*") and regional input price *index* ("*Input Prices*^{Regional}").

$$Cost_t = Input\ Quantities_t \times Input\ Prices_t^{Regional}. \quad [3]$$

The growth in the aggregated cost is the sum of the growth in these two indexes.

$$Growth\ Cost_t = growth\ Input\ Quantities_t + growth\ Input\ Prices_t^{Regional}. \quad [4]$$

[2] Relations with growth rates like [2] and [4] hold for particular kinds of growth rates.

The growth of a summary input price index is a cost-share weighted average of the growth of price subindexes for each input category. If there are *J* inputs, a general formula for growth in such an index is

$$growth\ Input\ Prices_t = SUM_{j=1}^{J} (cost\ share_j \times growth\ Input\ Price_{j,t}). \quad [5]$$

Rearranging the terms of relation [4] we then find that

$$growth\ Cost - growth\ Input\ Prices^{Regional} = growth\ Real\ Cost = growth\ Input\ Quantities \quad [6]$$

and that

$$growth\ Cost = growth\ Real\ Cost + growth\ Input\ Prices^{Regional}. \quad [7]$$

The growth in nominal cost is the sum of the growth in real (constant dollar) cost and the input price index.

2.2 Inflation Factors

The Basic Idea

Suppose, then, that in 2023 a utility makes a forecast of its cost in 2025 that is stated in 2023 dollars ("$Real\ Cost_{2025}^{2023}$"). This forecast can be converted to nominal 2025 dollars ("$Cost_{2025}^{2023}$") by multiplying it by an inflation factor using an index that measures forecasted regional input price inflation between 2023 and 2025.

$$Cost_{2025}^{2023} = Input\ Quantities_{2025}^{2023} \times Regional\ Input\ Prices_{2025}^{2023}$$

$$= (Input\ Quantities_{2025}^{2023} \times Regional\ Input\ Prices_{2023}^{2023}) \times \left(\frac{Regional\ Input\ Prices_{2025}^{2023}}{Regional\ Input\ Prices_{2023}^{2023}}\right)$$

$$= Real\ Cost_{2025}^{2023} \times \left(\frac{Regional\ Input\ Prices_{2025}^{2023}}{Regional\ Input\ Prices_{2023}^{2023}}\right). \quad [8]$$

Our analysis suggests that, for any group of PSE's base rate inputs, it is reasonable to construct a 2023 forecast of their cost in 2025 as the product of a forecast of their real cost in 2023 dollars and an inflation factor indicating forecasted inflation in regional prices of the inputs.

$$PSE\ Cost_{2025}^{2023} = PSE\ Real\ Cost_{2025}^{2023} \times \frac{Regional\ Input\ Prices_{2025}^{2023}}{Regional\ Input\ Prices_{2023}^{2023}}. \quad [9]$$

An alternative approach to adjusting the revenue requirement for inflation is to make separate inflation adjustments to numerous cost categories. Summary input price indexes with formulas like [8] make inflation adjustments simpler, but at the cost of having to design and explain the summary price index formulas.

Basing an Inflation Factor on a National Input Price Index

Good forecasts of inflation in regional prices are unavailable for many kinds of base rate inputs that PSE uses. However, for some of these inputs, forecasts are available for *national* input price trends. We know that

$$\textit{growth Regional Input Prices} \quad [10]$$
$$= \textit{growth National Input Prices} + (\textit{growth Regional Input Prices} - \textit{growth National Input prices})$$

where the term in parentheses may be called an inflation differential. In this case, the differential is between inflation in regional and national prices for some group of inputs.

Suppose, then, that the forecasted growth in regional input prices can be reasonably modeled as the forecasted growth in *national* input prices. Then

$$\textit{PSE Cost}_{2025}^{2023} = \textit{PSE Real Cost}_{2025}^{2023} \times \left(\frac{\textit{National Input Prices}_{2025}^{2023}}{\textit{National Input Prices}_{2023}^{2023}}\right). \quad [11]$$

Suppose, alternatively, that the forecasted growth in regional input prices is better modelled as the sum of the forecasted growth in national input prices and a long-term inflation differential, denoted by $(\overline{\textit{Regional Input Prices}} - \overline{\textit{National Input Prices}})$, which is defined as the difference between longer-term regional and national average input price growth trends. Formally,

$$\textit{growth Regional Input Prices}^{\textit{Forecasted}} = \textit{growth National Input Prices}^{\textit{Forecasted}} + (\overline{\textit{Regional Input Prices}} - \overline{\textit{National Input Prices}}). \quad [12]$$

We can use this formula to create the following cost forecast

$$\textit{PSE Cost}_{2025}^{2023} = \textit{PSE Real Cost}_{2025}^{2023} \times \left(\frac{\textit{National Input Prices}_{2025}^{2023}}{\textit{National Input Prices}_{2023}^{2023}}\right)^{\textit{Adjusted}} \quad [13]$$

where the inflation forecast has been adjusted to reflect the regional/national inflation differential.

Basing an Inflation Factor on a Macroeconomic Inflation Index

An alternative inflation factor formula reduces the role of industry input price indexes by instead using a *macroeconomic* inflation measure. These are measures of inflation in a broad swath of U.S. economic activity. We know that

$$\textit{growth Regional Input Prices} = \textit{growth GDP-PI} + (\textit{growth Regional Input Prices} - \textit{growth GDP-PI}) \quad [14]$$

where the term in parentheses is another kind of inflation differential. If we are confident that the trends in GDP-PI and input prices are reasonably similar we can use the formula

$$\textit{PSE Cost}_{2025}^{2023} = \textit{PSE Real Cost}_{2025}^{2023} \times \frac{\textit{GDP-PI}_{2025}^{2023}}{\textit{GDP-PI}_{2023}^{2023}}. \quad [15]$$

Suppose alternatively that it is better to model the forecasted growth in regional input prices as the sum of the forecasted growth in GDP-PI and a long-term inflation differential, denoted by $(\overline{\textit{Regional Input Prices}} - \overline{\textit{GDP-PI}})$, which is defined as the difference between the longer-term regional input price and GDP-PI growth trends. That is,

$$\textit{growth Regional Input Prices}^{\textit{Forecasted}} = \textit{growth GDP-PI}^{\textit{Forecasted}} + (\overline{\textit{Regional Input Prices}} - \overline{\textit{GDP-PI}}). \quad [16]$$

This result provides the basis for another inflation factor

$$\textit{PSE Cost}_{2025}^{2023} = \textit{PSE Real Cost}_{2025}^{2023} \times \left(\frac{\textit{GDP-PI}_{2025}^{2023}}{\textit{GDP-PI}_{2023}^{2023}}\right)^{\textit{Adjusted}} \quad [17]$$

where the forecast has been adjusted to reflect the differential between regional input price and macroeconomic price trends.

Sample Period

The sample period used to calculate long term inflation differentials has been a controversial issue in some proceedings where rate or revenue cap indexes are considered. There is general agreement that the period should be long enough to smooth fluctuations in inflation and should also capture a trend that is relevant to the years to which the MYRP will apply. We believe that a twenty-year period is generally preferable for calculating inflation differentials when twenty years of good data are available at reasonable cost.

Capital Prices

Since utilities have capital-intensive production technologies, an important focus of research on utility input price inflation is the measurement of *capital* price inflation. Most participants in utility ratemaking are unfamiliar with the concept of a capital price. The rate of return on assets, which is sometimes called the cost of capital, is only a component of the capital price. An explanation of the components of capital prices may therefore be helpful here.

The cost of owning capital has three components: taxes, depreciation, and the opportunity cost of capital ownership (aka the return on investment). All three of these cost components depend on prices of asset planning, acquisition, and/or construction. In utility cost research, the trend in the price of asset acquisition is often measured by utility construction cost indexes. The return on asset ownership depends, additionally, on the prevailing market rates of return on debt and equity. It is customary in statistical research on utility cost to make capital price inflation a function of trends in the rate of return and utility construction costs. The design of a capital price that is consistent with the cost of service capital accounting used in utility ratemaking is complex. In integrating inflation forecasts into capital cost forecasting in a rate application, a complicated capital price index formula can be sidestepped by forecasting the trends in asset price or construction cost indexes and then running these results through the Company's capital revenue requirement model.

3. Precedents for Using Inflation Indexes in Ratemaking

3.1 Comprehensive Rate and Revenue Cap Indexes

Use of index research in utility ratemaking has been facilitated in North America by good inflation data and the availability of standardized operating data for numerous utilities over many years. Most of these data have been gathered by U.S. government agencies.

The U.S. railroad industry was the first to use index research on a large scale in ratemaking.[3] In the 1980s, indexes of railroad cost were established by the Association of American Railroads subject to the oversight of the Interstate Commerce Commission. The formulas for indexes of railroad cost included input price indexes. Rail Cost Adjustment Factors based on such formulas were for several

[3] For more information on the early history of rate and revenue cap indexes in North America see Mark Newton Lowry and Lawrence Kaufmann, "Performance-Based Regulation of Energy Utilities," *Energy Law Journal*, Volume 23, No. 2, 2002, pp. 399-457.

years used to define a zone of rate freedom for class I line haul railroads and have subsequently driven pricing provisions of many rail-freight contracts.

Price cap indexes with inflation measures in their formulas have since been used on many occasions to set the rates of gas and electric utilities, telecommunications carriers, and oil pipelines. With the increased popularity of revenue decoupling, revenue cap indexes have been approved in lieu of price cap indexes for several energy utilities and these also contain inflation measures in their formulas. When MYRPs for energy utilities feature rate or revenue cap indexes, they also frequently feature provisions for supplemental revenue to compensate utilities for expected capital cost surges.

In the United States, macroeconomic inflation measures such as the GDP-PI are commonly used in comprehensive rate and revenue cap indexes. This practice raises the issue of whether the macroeconomic inflation index is an accurate measure of utility input price inflation. Evidence on this issue is commonly presented in proceedings to approve such MYRPs. Adjustments have been made to the index formulas on the basis of such evidence on several occasions to reflect a tendency of macroeconomic price inflation to be slower than input price inflation.

3.2 Hybrid and Stairstep Revenue Caps

Some MYRPs have featured "hybrid" approaches to revenue cap construction that use a mix of indexing and other escalation methods (e.g., forecasting). The most popular hybrid approach involves separate treatment of revenue requirements for O&M and capital costs. Specifically, indexes with inflation measures in their formulas escalate O&M revenue ("ROM") while capital revenue has prescheduled annual increases that are sometimes called "stairsteps". This approach has been particularly popular in California.

Many MYRPs feature stairsteps for all base rate revenue. This approach to revenue cap design has also been used numerous times in California and is popular in New York state.[4] Where revenue caps take this form, multiyear O&M revenue requirements are sometimes established using escalators that include inflation measures.

[4] See, for example, California PUC Decisions 07-03-044, 08-07-046, 11-05-018, 13-05-010, 16-06-054, and 17-05-013, as well as New York PSC orders in Cases 89-E-175, 07-E-0949, 14-E-0318, 15-E-0283, 16-E-0060, and 17-E-0238.

3.3 Forward Test Years

General rate cases involve test years in which a utility's cost and billing determinants (e.g., delivery volumes) are jointly considered. A forward test year ("FTY") begins after the rate case is filed.[5] An FTY typically begins about the time the rate case is expected to end and new rates take effect. Two-year cost forecasts are required in this event that span both the year of the rate case and the rate effective year. Forward test years are used frequently or occasionally in more than half of all states in retail energy utility ratemaking and are widely used in Canada. Inflation indexes are sometimes used to establish forward test year revenue requirements.

4. Details of the Empirical Research

4.1 Overview

The Company asked PEG to conduct input price inflation research for the following O&M cost categories.

Electricity

- Production (excluding generation fuel and purchased power)
- Transmission (excluding transmission by others)
- Distribution
- Customer Accounts
- Customer Service and Information (excluding conservation)
- Administrative and General

Gas

- Distribution (excluding compressor station fuel)
- Customer Accounts
- Customer Service and Information (excluding conservation)
- Administrative and General

[5] For further discussion of FTYs see Mark Newton Lowry, et al., *Forward Test Years for U.S. Energy Utilities,* Edison Electric Institute, 2010.

For these O&M cost categories we were asked to itemize inflation in salary and wage ("S&W") rates and material and service ("M&S") prices.

PSE also asked PEG to develop price inflation escalators for the following kinds of capex.

Electricity

Production (excluding Colstrip)

Transmission

Distribution

Gas

General

Intangible

We considered a wide range of price indexes for use in our inflation calculations. PEG also examined multiple rounds of detailed projections of the Company's salaries and wages, material, service, and capital expenses.

Logarithmic Vs. Arithmetic Growth Rates

In all of our research in this project we have used logarithmic growth rates [e.g., ln (P_t / P_{t-1})] rather than arithmetic growth rates [e.g., ($P_t - P_{t-1}$) / P_{t-1}]. These have several desirable properties including the symmetry of increasing and declining growth (i.e., the growth rate from *t-1* to *t* is the negative of the growth rate from *t* to *t-1*). This is not true of arithmetic growth rates where if something declines by 50% it requires 100% growth to return to the same level. Another advantage of logarithmic growth rates is that the average annual growth rate from year *t* to year *t+s* equals the average of the annual growth rates

$$\ln \frac{(Index_{t+s}/Index_t)}{S} = \frac{\sum_{s=1}^{S} \ln(Index_{t-s}/Index_{t-s-1})}{S}. \quad [18]$$

The inflation factors that result from our research do not require logarithmic growth calculations in real-to-nominal cost conversions since we have used the following exponentiation formula in calculating inflation factors.

$$Input\ Prices_t = Input\ Prices_{t-1} \times exp\left[\ln\left(\frac{Input\ Price_{j,t}}{Input\ Price_{j,t-1}}\right)\right]. \quad [19]$$

4.2 Inflation Measures

Criteria for Choosing Inflation Measures

The following criteria are important for choosing inflation measures used in ratemaking.

Relevance

Indexes are relevant to the extent that they track the market price trends actually faced by subject utilities for their inputs. Indexes designed to measure same-region input price inflation are generally more relevant than indexes of national input price or macroeconomic (e.g., multi-sector) price inflation. For PSE, indexes specific to Washington state can be useful as well as indexes for the Seattle-Tacoma-Bellevue metropolitan area. The Company draws workers from the entire state and has generation operations outside metro Seattle. Indexes of price trends in the Pacific or broader West region are generally more relevant than those for the entire US.

Stability

Inflation index growth should not be needlessly volatile.

Availability of Forecasts

Inflation indexes are more useful to the extent that forecasts are readily available and frequently updated.

Credibility

Inflation indexes should ideally be computed and forecasted by credible public or private agencies. Credible agencies that calculate inflation indexes that are relevant for utility ratemaking include the Bureau of Labor Statistics ("BLS") unit of the U.S. Department of Labor, the Bureau of Economic Analysis ("BEA") unit of the U.S. Department of Commerce, Standard and Poor's ("S&P") Global, and Whitman, Requardt and Associates. S&P Global offers a Power Planner service that maintains and forecasts price indexes for gas and electric utility salaries and wages, materials and services, and construction costs. Previously called the Utility Cost Information Service, this service has been offered since the 1980s by a sequence of entities that has also included Data Resources Inc., Global Insight, and IHS Markit. Credible forecasters of macroeconomic price inflation include the CBO and Moody's Investors Service.

Labor Price Indexes

The BLS maintains several labor price indexes that are useful in utility ratemaking. Most of these measure trends in prices that are implicit in the salaries and wages that employers pay. These indexes effectively measure trends in unit salaries and wages. We will call these "wage rate" indexes for simplicity. Some labor price indexes additionally address growth in the unit cost of pensions and other benefits.

Employment Cost Indexes

One useful group of wage rate indexes is the employment cost indexes ("ECIs") that are based on data from the BLS National Compensation Survey ("NCS"). The growth (rate) of an ECI is a weighted average of growth in the hourly compensation of various kinds of workers. This index design guards against aggregation bias from a change in the mix of higher and lower paid workers over time. Each ECI weight is the share of the corresponding job category in the aggregate compensation considered.[6] A few ECIs are available for metropolitan areas and broader regions of the U.S. as well as for the entire country. ECIs are available for total compensation as well as for salaries and wages.

Here are some ECIs for the salaries and wages of private industry workers for which forecasts are available.

Forecasted ECIs for Salaries and Wages of Private Industry Workers

Occupations (Salaries and wages only)	**Region**	**Forecasters**
All Occupations, All Industries, All Workers	US only	CBO, Moody's
Management, Business, Financial, All Industries, All Workers	US only	Power Planner
Professional and Related, All Industries, All Workers	US only	Power Planner
Scientific and Technical, All Industries, All Workers	US only	Power Planner

[6] These weights are static for several years at a time. When the ECI weights are updated, the BLS uses Occupational Employment and Wage Statistics data.

Tables 1a and 1b below detail historical trends in ECIs for salaries and wages and total compensation, respectively, of all private industry workers and of all utility workers in the U.S. and West region. Since 2007, growth rates for these ECIs have also been available for the Pacific region. Since 2011, they have also been available for the Seattle metro area. The following results are salient.

- Over the twelve complete years for which full annual growth rates are available (2011-2022), growth in the Seattle-area ECI for salaries and wages of all private industry workers has exceeded growth in the analogous national index by about 0.24% annually on average. During the same years, growth in the Seattle-area ECI for *total compensation* has exceeded that of the corresponding U.S. index by 0.51% annually.

Table 1a

Historical Trends of Employment Cost Indexes for Wages and Salaries

	BLS - Employment Cost Indexes, Wages and Salaries Only[1]										
	All Private Industry Workers,[2] All Occupations									Utility Industry[3]	
	Nationwide		West Region[4]			Pacific Region[5]		Seattle-Tacoma, WA Metro Area[6]		Nationwide	
Year	Growth Rates[7] [A]	Seasonally Adjusted Growth Rates[7]	Index Level	Growth Rates[7] [B]	West Inflation Differential [B] - [A]	Growth Rates[7] [C]	Pacific Inflation Differential [C] - [A]	Growth Rates[7] [D]	Seattle Inflation Differential [D-A]	Growth Rates[7] [E]	Utility Inflation Differential [E] - [A]
2001			88.775								
2002	3.16%	3.16%	91.575	3.11%	-0.05%	NA	NA	NA	NA	3.54%	0.38%
2003	2.88%	2.80%	94.375	3.01%	0.13%	NA	NA	NA	NA	2.67%	-0.20%
2004	2.59%	2.62%	97.275	3.03%	0.44%	NA	NA	NA	NA	2.99%	0.40%
2005	2.45%	2.45%	99.325	2.09%	-0.36%	NA	NA	NA	NA	2.71%	0.26%
2006	2.83%	2.88%	102.175	2.83%	0.00%	NA	NA	NA	NA	3.05%	0.22%
2007	3.35%	3.32%	105.850	3.53%	0.18%	3.29%	-0.05%	NA	NA	3.20%	-0.15%
2008	2.92%	2.92%	109.300	3.21%	0.29%	3.12%	0.20%	NA	NA	3.14%	0.22%
2009	1.55%	1.58%	111.025	1.57%	0.01%	1.64%	0.08%	NA	NA	2.78%	1.23%
2010	1.62%	1.60%	112.575	1.39%	-0.23%	1.34%	-0.27%	NA	NA	2.44%	0.83%
2011	1.64%	1.61%	114.275	1.50%	-0.14%	1.70%	0.06%	1.64%	0.00%	2.73%	1.09%
2012	1.80%	1.80%	116.100	1.58%	-0.22%	1.84%	0.04%	1.81%	0.00%	2.43%	0.62%
2013	1.86%	1.88%	118.300	1.88%	0.02%	1.91%	0.06%	2.49%	0.64%	2.73%	0.87%
2014	1.99%	2.01%	120.900	2.17%	0.19%	2.11%	0.12%	1.66%	-0.33%	2.68%	0.69%
2015	2.25%	2.21%	123.900	2.45%	0.20%	2.41%	0.15%	2.91%	0.65%	2.46%	0.20%
2016	2.32%	2.34%	127.350	2.75%	0.42%	3.11%	0.79%	3.37%	1.04%	2.32%	0.00%
2017	2.54%	2.52%	131.450	3.17%	0.63%	3.32%	0.78%	3.54%	1.00%	2.69%	0.15%
2018	2.97%	2.99%	136.325	3.64%	0.67%	3.74%	0.78%	3.66%	0.69%	2.41%	-0.56%
2019	2.94%	2.90%	140.700	3.16%	0.22%	3.26%	0.32%	2.35%	-0.59%	2.75%	-0.19%
2020	2.89%	2.91%	145.225	3.17%	0.28%	3.19%	0.30%	3.54%	0.65%	2.20%	-0.69%
2021	3.95%	3.92%	151.075	3.95%	0.00%	3.83%	-0.12%	2.79%	-1.17%	2.62%	-1.34%
2022	5.12%	5.15%	159.400	5.36%	0.25%	5.18%	0.06%	5.35%	0.24%	3.30%	-1.82%
2023*	4.61%	4.61%		4.95%	0.33%	4.94%	0.33%	5.26%	0.65%	3.98%	-0.63%

** 2023 inflation rates compare the mean of index levels in the first 3 quarters of 2023 to those in the first 3 quarters of 2022.*

Average Annual Growth Rates										
2011-2022 (12 growth rate years)	2.69%	2.69%	2.90%	0.21%	2.97%	0.28%	2.92%	0.24%	2.61%	-0.08%
2011-2023 (13 growth rate years)	2.84%	2.84%	3.06%	0.22%	3.12%	0.28%	3.10%	0.27%	2.71%	-0.12%
2007-2022 (16 growth rate years)	2.61%	2.60%	2.78%	0.17%	2.81%	0.21%	NA	NA	2.68%	0.07%
2007-2023 (17 growth rate years)	2.72%	2.72%	2.91%	0.18%	2.94%	0.21%	NA	NA	2.76%	0.03%
2003-2022 (20 growth rate years)	2.62%	2.62%	2.77%	0.15%	NA	NA	NA	NA	2.71%	0.09%
2004-2023 (20 growth rate years)	2.71%	2.71%	2.87%	0.16%	NA	NA	NA	NA	2.78%	0.07%

Standard Deviation of Growth Rates										
2011-2022 (12 growth rate years)	1.00%	1.01%	1.10%		1.03%		1.06%		0.28%	
2003-2022 (20 growth rate years)	0.86%	0.86%	0.98%		1.02%		NA		0.30%	

[1]Wage and salary workers are those who receive wages, salaries, commissions, tips, or payment in kind from a private-sector employer or from a local, state, or federal government agency or entity. This includes paid employees of charities, nonprofits, religious, and civic organizations. In the labor force, employment, and unemployment data published by the Bureau of Labor Statistics, most Current Population Survey estimates of wage and salary workers include the incorporated self-employed. This is because, technically, the incorporated self-employed are paid employees of their corporation. Source: https://www.bls.gov/cps/definitions.htm#wagesalary

[2]Private industry employees include most corporate officials, all executives, all supervisory personnel, all professionals, all clerical workers, many farmworkers, all wage earners, all pieceworkers, and all part-time workers. Workers on paid sick leave, paid holiday, paid vacation, and the like also are covered. Workers on the payroll of more than one firm during the period are counted by each employer that is subject to unemployment insurance, as long as those workers satisfy the preceding definition of employment.

[3]The Utilities sector comprises establishments engaged in the provision of electric power, natural gas, steam, water, and sewage removal. Within this sector, the specific activities associated with the utility services provided vary by utility: electric power includes generation, transmission, and distribution; natural gas includes distribution; steam supply includes provision and/or distribution; water supply includes treatment and distribution; and sewage removal includes collection, treatment, and disposal of waste through sewer systems and sewage treatment facilities. Excluded from this sector are establishments primarily engaged in waste management services classified in Subsector 562, Waste Management and Remediation Services. These establishments also collect, treat, and dispose of waste materials; however, they do not use sewer systems or sewage treatment facilities.

[4]West Region includes the Mountain and Pacific Divisions (Mountain Division includes Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, and Wyoming)

[5]Pacific Division includes Alaska, California, Hawaii, Oregon, and Washington.

[6]Seattle-Tacoma, WA CSA includes Island, King, Kitsap, Lewis, Mason, Pierce, Skagit, Snohomish, and Thurston Counties in Washington.

[7]All growth rates are calculated logarithmically and represent non-seasonally-adjusted growth rates unless otherwise noted. While non-seasonally-adjusted growth rates are preferred, several forecasts are only available as seasonally-adjusted estimates.

Table 1b

Historical Trends of Employment Cost Indexes for Total Compensation

	BLS - Employment Cost Indexes, Total Compensation[1]								
	All Private Industry Workers,[2] All Occupations							Utilities Sector[3]	
	Nationwide	West Region[4]		Pacific Region[5]		Seattle Area[6]		Nationwide	
	Growth Rates[7]	Growth Rates[7]	West Inflation Differential	Growth Rates[7]	Pacific Inflation Differential	Growth Rates[7]	Seattle Inflation Differential	Growth Rates[7]	Utility Inflation Differential
Year	[A]	[B]	[B] - [A]	[C]	[C] - [A]	[D]	[D] - [A]	[E]	[E] - [A]
2001									
2002	3.51%	3.70%	0.20%	NA	NA	NA	NA	4.50%	0.99%
2003	3.68%	4.17%	0.48%	NA	NA	NA	NA	3.89%	0.20%
2004	3.76%	4.21%	0.45%	NA	NA	NA	NA	5.56%	1.80%
2005	3.05%	2.96%	-0.08%	NA	NA	NA	NA	5.06%	2.02%
2006	2.88%	2.61%	-0.28%	NA	NA	NA	NA	9.76%	6.88%
2007	3.06%	3.23%	0.17%	3.00%	-0.07%	NA	NA	-4.56%	-7.62%
2008	2.81%	3.18%	0.37%	3.16%	0.35%	NA	NA	3.18%	0.37%
2009	1.42%	1.35%	-0.07%	1.49%	0.07%	NA	NA	2.76%	1.34%
2010	1.89%	1.58%	-0.32%	1.60%	-0.29%	NA	NA	5.25%	3.35%
2011	2.14%	2.14%	0.00%	2.32%	0.18%	2.62%	0.47%	3.30%	1.16%
2012	1.91%	1.76%	-0.15%	1.95%	0.04%	1.88%	-0.02%	3.24%	1.33%
2013	1.89%	1.98%	0.09%	1.99%	0.10%	2.98%	1.09%	1.57%	-0.32%
2014	2.06%	2.19%	0.12%	2.43%	0.36%	2.69%	0.63%	2.03%	-0.03%
2015	2.08%	2.32%	0.24%	2.29%	0.21%	3.15%	1.07%	3.12%	1.04%
2016	2.12%	2.60%	0.48%	2.82%	0.71%	2.54%	0.42%	2.55%	0.43%
2017	2.42%	3.13%	0.70%	3.29%	0.87%	4.78%	2.36%	2.51%	0.08%
2018	2.85%	3.36%	0.51%	3.48%	0.63%	3.99%	1.14%	2.81%	-0.05%
2019	2.67%	2.76%	0.09%	2.68%	0.01%	0.80%	-1.87%	3.54%	0.87%
2020	2.60%	2.86%	0.26%	2.85%	0.25%	2.49%	-0.10%	2.30%	-0.30%
2021	3.52%	3.60%	0.09%	3.49%	-0.03%	3.95%	0.43%	2.66%	-0.86%
2022	5.03%	5.13%	0.10%	5.01%	-0.02%	5.52%	0.49%	3.32%	-1.71%
2023*	4.41%	4.57%	0.16%	4.52%	0.11%	2.89%	-1.52%	4.25%	-0.16%

** 2023 inflation rates compare the mean of index levels in the first 3 quarters of 2023 to those in the first 3 quarters of 2022.*

Average Annual Growth Rates									
2011-2022 (12 growth rate years)	**2.61%**	**2.82%**	**0.21%**	**2.88%**	**0.28%**	**3.12%**	**0.51%**	**2.74%**	**0.14%**
2011-2023 (13 growth rate years)	**2.75%**	**2.95%**	**0.21%**	**3.01%**	**0.26%**	**3.10%**	**0.35%**	**2.86%**	**0.11%**
2007-2022 (16 growth rate years)	**2.53%**	**2.70%**	**0.17%**	**2.74%**	**0.21%**	**NA**	**NA**	**2.47%**	**-0.06%**
2007-2023 (17 growth rate years)	**2.64%**	**2.81%**	**0.17%**	**2.84%**	**0.20%**	**NA**	**NA**	**2.58%**	**-0.06%**
2003-2022 (20 growth rate years)	**2.69%**	**2.85%**	**0.16%**	**NA**	**NA**	**NA**	**NA**	**3.19%**	**0.50%**
2004-2023 (20 growth rate years)	**2.73%**	**2.87%**	**0.15%**	**NA**	**NA**	**NA**	**NA**	**3.21%**	**0.48%**
Standard Deviation of Growth Rates									
2011-2022 (12 growth rate years)	**0.89%**	**0.92%**		**0.85%**		**1.28%**		**0.59%**	
2003-2022 (20 growth rate years)	**0.85%**	**0.95%**		**0.87%**		**NA**		**2.55%**	

[1]According to the BLS, Total Compensation refers to the entire range of wages, salaries, and benefits employees receive for their work.

[2]Private industry employees include most corporate officials, all executives, all supervisory personnel, all professionals, all clerical workers, many farmworkers, all wage earners, all pieceworkers, and all part-time workers. Workers on paid sick leave, paid holiday, paid vacation, and the like also are covered. Workers on the payroll of more than one firm during the period are counted by each employer that is subject to unemployment insurance, as long as those workers satisfy the preceding definition of employment.

[3]The Utilities sector comprises establishments engaged in the provision of electric power, natural gas, steam, water, and sewage removal. Within this sector, the specific activities associated with the utility services provided vary by utility: electric power includes generation, transmission, and distribution; natural gas includes distribution; steam supply includes provision and/or distribution; water supply includes treatment and distribution; and sewage removal includes collection, treatment, and disposal of waste through sewer systems and sewage treatment facilities. Excluded from this sector are establishments primarily engaged in waste management services classified in Subsector 562, Waste Management and Remediation Services. These establishments also collect, treat, and dispose of waste materials; however, they do not use sewer systems or sewage treatment facilities.

[4]West Region includes the Mountain and Pacific Divisions (Mountain Division includes Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, and Wyoming).

[5]Pacific Division includes Alaska, California, Hawaii, Oregon, and Washington.

[6]Seattle-Tacoma, WA CSA includes Island, King, Kitsap, Lewis, Mason, Pierce, Skagit, Snohomish, and Thurston Counties in Washington.

[7]All growth rates are calculated logarithmically.

- Over the 16 years for which full-year growth rates are as yet available (2007-2022), growth in the Pacific region ECIs for salaries and wages and total compensation have both exceeded growth in the corresponding U.S. ECIs by 0.21% annually on average. Over the most recent twenty years for which full annual growth rates are available (2003-2022), growth in the West region ECIs for salaries and wages and total compensation exceeded growth in the corresponding national ECIs by 0.15% and 0.16% annually.

  All of these results support a positive inflation differential in the event that a national labor price index is used in PSE's ratemaking.

- Over the most recent twenty complete years for which annual growth rates are available (2003-2022), the trend in ECIs for utility salaries and wages exceeded the corresponding national ECI for all private industry workers by an average of 9 basis points annually. During these same years, the ECI for utility *total* compensation exceeded that for all private industry workers by a more substantial average of 50 basis points annually.

  Both of these ECIs have grown more slowly for the utility industry in at least the last three years. One possible reason is that utilities find it difficult to obtain base rate increases from regulators when the economy is performing poorly. The discrepancy likely also reflects greater use of union and other multiyear labor contracts in the utility industry. Wage rates in these contracts may be less sensitive to current labor market conditions. We used the standard deviation of annual growth rates to measure the volatility of measured inflation and found that inflation in the ECI for salaries and wages in the U.S. utility industry was much less volatile than that of the salary and wage ECI for all U.S. private industry workers.

Table 1c below details historical trends in some additional ECIs for salaries and wages that are available at the national level and forecasted by Power Planner. It can be seen that the growth trend in the ECIs for select professional occupations was a little slower than that for all utility occupations.

Average Weekly Wages

Another useful set of labor price indicators is Average Weekly Wages ("AWWs"). Data used to compute these metrics are drawn from the BLS Quarterly Census of Employment and Wages ("QCEW"). The QCEW is a true census of administrative data from employers, so wages and employment figures are not statistically extrapolated from surveys. The BLS states that more than 95% of U.S. jobs are

Table 1c

Historical Trends of Employment Cost Indexes for Select Occupations

	BLS Employment Cost Indexes, Wages and Salaries Only[1]			
	All Private Industry Workers in Select Occupations[2]			Utility Industry[3]
	Professional and Related Occupations	Management, Business, and Financial Occupations	Professional, Scientific, and Technical Services	All Occupations
	Growth Rates[4]			
Year				
2001				
2002	2.88%	3.60%	1.47%	3.54%
2003	2.61%	4.24%	1.92%	2.67%
2004	3.25%	1.94%	3.71%	2.99%
2005	2.99%	1.90%	1.69%	2.71%
2006	3.27%	2.72%	3.13%	3.05%
2007	3.81%	3.29%	4.18%	3.20%
2008	3.19%	3.21%	4.44%	3.14%
2009	1.83%	1.12%	1.74%	2.78%
2010	1.42%	1.97%	1.61%	2.44%
2011	1.64%	1.67%	2.53%	2.73%
2012	1.78%	1.69%	1.62%	2.43%
2013	1.94%	2.21%	1.64%	2.73%
2014	1.80%	2.28%	1.71%	2.68%
2015	1.99%	2.45%	2.35%	2.46%
2016	1.89%	2.47%	1.76%	2.32%
2017	2.01%	2.51%	2.18%	2.69%
2018	2.48%	2.63%	2.76%	2.41%
2019	2.22%	2.53%	2.49%	2.75%
2020	2.24%	2.11%	2.91%	2.20%
2021	2.91%	2.86%	2.58%	2.62%
2022	4.40%	3.93%	4.59%	3.30%
2023*	4.78%	3.67%	4.20%	3.98%

** 2023 inflation rates compare the mean of index levels in the first 3 quarters of 2023 to those in the first 3 quarters of 2022.*

Average Annual Growth Rates				
2003-2022 (20 growth rate years)	**2.48%**	**2.49%**	**2.58%**	**2.71%**
2004-2023 (20 growth rate years)	**2.59%**	**2.46%**	**2.69%**	**2.78%**
Standard Deviation of Growth Rates				
2003-2022 (20 growth rate years)	**0.80%**	**0.76%**	**0.98%**	**0.30%**

[1]Wage and salary workers are those who receive wages, salaries, commissions, tips, or payment in kind from a private-sector employer or from a local, state, or federal government agency or entity. This includes paid employees of charities, nonprofits, religious, and civic organizations. In the labor force, employment, and unemployment data published by the Bureau of Labor Statistics, most Current Population Survey estimates of wage and salary workers include the incorporated self-employed. This is because, technically, the incorporated self-employed are paid employees of their corporation. Source: https://www.bls.gov/cps/definitions.htm#wagesalary

[2]Private industry employees include most corporate officials, all executives, all supervisory personnel, all professionals, all clerical workers, many farmworkers, all wage earners, all pieceworkers, and all part-time workers. Workers on paid sick leave, paid holiday, paid vacation, and the like also are covered. Workers on the payroll of more than one firm during the period are counted by each employer that is subject to unemployment insurance, as long as those workers satisfy the preceding definition of employment.

[3]The Utilities sector comprises establishments engaged in the provision of electric power, natural gas, steam, water, and sewage removal. Within this sector, the specific activities associated with the utility services provided vary by utility: electric power includes generation, transmission, and distribution; natural gas includes distribution; steam supply includes provision and/or distribution; water supply includes treatment and distribution; and sewage removal includes collection, treatment, and disposal of waste through sewer systems and sewage treatment facilities. Excluded from this sector are establishments primarily engaged in waste management services classified in Subsector 562, Waste Management and Remediation Services. These establishments also collect, treat, and dispose of waste materials; however, they do not use sewer systems or sewage treatment facilities.

[4]All growth rates are calculated logarithmically.

covered by the QCEW. The BLS uses the QCEW data in a yearly benchmark revision conforming the Average Hourly Earnings wage measures (discussed in the following section) to the actual trends. The QCEW data is also the source for QCEW employment counts used for ECI reweightings. Another advantage of AWW data for this project is that they are available for the utility industry specifically by state and county as well as for the U.S.

Since the AWWs measure actual utility wage rate inflation at the state and county level, they clearly meet the ratemaking criteria of relevance and credibility. However, the growth rates of AWWs are not weighted averages of growth rates of wages of various employment categories. They are therefore more sensitive than ECIs to changes in industry labor composition and subject to more aggregation bias and volatility in the short term. At the onset of a recession, for example, AWW growth may be bolstered counterintuitively by disproportionately large layoffs of lower-paid workers, while the reverse may be true during a recovery. The importance of this idiosyncrasy to the present project is magnified by the fact that the United States recently experienced a recession. Note also that whereas the availability of more granular regional data increases the AWWs' potential relevance to ratemaking, the increased specificity of locale also tends to produce more volatility.

Another limitation of AWWs is that forecasts are to our knowledge unavailable. This reduces their usefulness in constructing wage rate inflation forecasts for PSE. However, the desirable attributes of AWWs make them useful in evaluating whether wage rate inflation trends faced by Washington utilities differ materially from the corresponding national trends. Computing a long-term average inflation differential in these wage rates smooths out the year-to-year volatility.

Table 2 details historical inflation in AWWs for all employees working for utilities in the U.S., the state of Washington, and in ten counties where PSE has provided gas and/or electric service. For these ten counties we computed average trends using the number of private utility employees in each county (which is also available from the QCEW) to construct weights.[7]

[7] The summary measure of growth in utility wage rates for the ten relevant counties presented in Table 2 was calculated as follows:

- We identified 10 counties where PSE provides gas and/or electric services and then gathered the utility industry AWWs from 2002 forward for each of those counties. Those counties are Island, King, Kitsap, Kittitas, Lewis, Pierce, Skagit, Snohomish, Thurston, and Whatcom. These counties include the majority of PSE's service territory.

Table 2

Historical Trends of Private-Sector Average Weekly Utility Industry Wages[1,2]

Year	Nationwide	Washington State		Selected Counties in PSE Service Territory[3]	
	Growth Rates [A]	Growth Rates [B]	Inflation Differential [B-A]	Weighted Average Growth Rates[4] [C]	Inflation Differential [C-A]
2002	2.74%	-0.18%	-2.91%	1.95%	-0.79%
2003	1.83%	0.79%	-1.05%	-1.86%	-3.69%
2004	5.31%	6.73%	1.42%	8.72%	3.41%
2005	3.81%	2.73%	-1.08%	3.26%	-0.54%
2006	4.13%	6.96%	2.83%	6.52%	2.39%
2007	4.86%	4.62%	-0.24%	4.90%	0.05%
2008	2.25%	4.28%	2.03%	6.15%	3.90%
2009	0.86%	9.22%	8.36%	11.09%	10.22%
2010	2.24%	-8.42%	-10.66%	-13.86%	-16.11%
2011	4.28%	5.67%	1.39%	4.59%	0.31%
2012	3.39%	2.32%	-1.07%	2.74%	-0.65%
2013	1.54%	2.75%	1.20%	2.34%	0.80%
2014	3.07%	0.96%	-2.11%	1.59%	-1.48%
2015	3.34%	6.19%	2.85%	2.75%	-0.59%
2016	1.37%	-4.94%	-6.32%	0.34%	-1.04%
2017	4.11%	5.28%	1.17%	5.42%	1.31%
2018	2.59%	6.91%	4.32%	5.60%	3.02%
2019	3.03%	5.43%	2.40%	5.75%	2.73%
2020	3.29%	3.30%	0.01%	2.52%	-0.77%
2021	2.15%	3.47%	1.32%	3.45%	1.30%
2022	3.58%	7.81%	4.22%	6.06%	2.48%
2023*	6.50%	8.03%	1.53%	NA	NA
Average Annual Growth Rates					
2003-2022 (20 growth rate years)	3.05%	3.60%	0.55%	3.40%	0.35%
2004-2023 (20 growth rate years)	3.29%	3.96%	0.68%	NA	NA
Standard Deviation of Growth Rates					
2003-2022 (20 growth rate years)	1.19%	4.20%	NA	4.98%	NA

*Preliminary result based on the year-over-year percent change from the average of Q1 and Q2 2022 to the average of Q1 and Q2 2023.

[1]All growth rates are calculated logarithmically.

[2]Source: BLS Quarterly Census of Employment and Wages

[3]Selected counties in PSE's service area are as follows: Island, King, Kitsap, Kittitas, Lewis, Pierce, Skagit, Snohomish, Thurston, and Whatcom.

[4]Weighted average growth rates were calculated by multiplying the wage growth rate of each county by that county's relative share of utility employees and summing across all ten counties.

- From the same QECW source data, we gathered the total number of utility industry employees for each of those counties. With the sum of the total utility employees over the ten counties as the denominator, we calculated the share of aggregate utility employees in each of the counties.

  To create the composite ten-county growth rate, we multiplied the AWW growth rate for each county by its corresponding percentage of utility employees.

For purposes of Table 2, please note the following:

- We once again used the standard deviation of the growth rates to measure the volatility of AWW inflation. Over the twenty most recent complete years (2003-22), the volatility of national utility industry AWW inflation was considerably higher than that of the corresponding national utility ECI. It can also be seen that the volatility of AWWs was considerably greater the more local is the region considered.
- Over these same 20 years, the average growth in the utility industry AWWs for ten counties which PSE serves and for Washington state exceeded the growth in the corresponding national utility industry AWWs, by 0.35% and 0.55% respectively.

The assembled evidence suggests that an appropriate wage rate regional inflation differential for PSE lies in the [0.24% to 0.55%] range. We recommend a value of 0.35% for this differential when applied to the wage rate inflation that PSE faces. A 0.35% differential is also suitable for the total compensation inflation that other Seattle-area businesses (e.g., tree trimmers) face.

Average Hourly Earnings

The BLS also calculates average *hourly* earnings ("AHEs") in various industries. These are drawn from the BLS Current Employment Survey. Compared to ECIs and AWWs, an advantage of these metrics is that they are available for more detailed sectors of the economy such as particular kinds of energy utility operations. Since 2008 itemized growth rates have furthermore been available for all workers as well as for production and non-supervisory workers. However, AHEs share with ECIs the disadvantages that they are based on surveys and are not available regionally for utility industries. AHEs share with AWWs the disadvantage that they are not weighted averages of wage rate trends for varied employment categories. This increases aggregation bias and this bias is particularly likely during and shortly after a recession.

Table 3 presents historical data on inflation in some pertinent AHEs. Results are provided for all employees and for production and nonsupervisory employees. Please note the following.

- AHEs are available for gas distribution and several activities of electric utility services.
- AHEs have been growing more rapidly for gas than for generation, transmission, and distribution workers.

- We compared the volatility of the AHEs to that of ECIs using standard deviations of the annual growth rates.

Table 3

Historical Trends of Average Hourly Earnings[1,2]

Growth Rates

Not Seasonally Adjusted

	Total Private Industry		Utilities		Electric Power Generation, Transmission, & Distribution		Natural Gas Distribution	
Year	All employees	Production and nonsupervisory employees	All employees	Production and nonsupervisory employees	All employees	Production and nonsupervisory employees	All employees	Production and nonsupervisory employees
2000								
2001		3.71%		3.58%		3.36%		4.02%
2002		2.85%		1.60%		2.72%		-3.30%
2003		2.64%		3.32%		4.26%		1.10%
2004		2.06%		3.33%		3.18%		6.02%
2005		2.71%		4.09%		4.25%		5.90%
2006		3.90%		2.66%		2.57%		2.90%
2007		3.86%		1.74%		3.09%		-3.27%
2008	3.01%	3.67%	6.24%	3.35%	3.57%	3.40%	13.99%	0.22%
2009	2.79%	2.95%	1.91%	2.23%	1.06%	1.61%	3.28%	3.26%
2010	1.74%	2.34%	-0.89%	1.88%	1.41%	1.65%	-9.85%	2.32%
2011	2.06%	2.03%	3.23%	2.56%	3.04%	2.40%	3.89%	2.64%
2012	1.98%	1.53%	1.86%	2.53%	2.42%	2.53%	1.09%	5.45%
2013	1.94%	2.01%	2.65%	2.07%	2.58%	1.81%	3.77%	3.98%
2014	2.11%	2.31%	1.22%	1.81%	1.33%	2.36%	0.49%	-0.13%
2015	2.26%	2.07%	4.23%	3.47%	4.14%	3.25%	3.25%	2.53%
2016	2.45%	2.35%	3.13%	3.78%	3.75%	4.86%	0.06%	1.09%
2017	2.62%	2.39%	2.40%	2.49%	3.56%	3.73%	-0.34%	-0.51%
2018	2.96%	2.95%	3.41%	1.48%	1.72%	0.23%	11.36%	7.51%
2019	3.19%	3.46%	2.70%	0.41%	1.95%	-1.30%	5.61%	7.48%
2020	4.74%	4.86%	4.13%	4.11%	3.34%	2.21%	7.10%	9.10%
2021	4.17%	4.82%	3.19%	3.93%	3.19%	3.50%	4.43%	5.11%
2022	5.25%	6.21%	5.55%	5.47%	5.37%	5.80%	5.65%	5.29%
2023*	4.26%	4.69%	4.93%	4.98%	5.76%	6.55%	1.87%	0.14%

** 2023 inflation rates compare the mean of index levels in the first 11 months of 2023 to those in the first 11 months of 2022 for Total Private Industry and Utilities Industry and for the first 10 months of 2023 and 2022 for Electric Power Generation, Transmission, and Distribution and Natural Gas Distribution.*

Average Annual Growth Rates								
2003-2022 (20 growth rate years)	NA	3.05%	NA	2.84%	NA	2.77%	NA	3.40%
2004-2023 (20 growth rate years)	NA	3.16%	NA	2.92%	NA	2.88%	NA	3.35%
2008-2022 (15 growth rate years)	2.89%	3.06%	3.00%	2.77%	2.83%	2.54%	3.58%	3.69%
2009-2023 (15 growth rate years)	2.97%	3.13%	2.91%	2.88%	2.98%	2.75%	2.78%	3.69%
Standard Deviation of Growth Rates								
2003-2022 (20 growth rate years)	NA	1.19%	NA	1.16%	NA	1.58%	NA	3.13%
2008-2022 (15 growth rate years)	1.06%	1.32%	1.72%	1.26%	1.20%	1.73%	5.44%	2.95%

Notes

All growth are rates calculated logarithmically.

Source: Current Employment Suvery data from the Bureau of Labor Statistics

[1]Production and related employees in manufacturing and in mining and logging include working supervisors and all nonsupervisory employees (including group leaders and trainees) engaged in fabricating, processing, assembling, inspecting, receiving, storing, handling, packing, warehousing, shipping, trucking, hauling, maintenance, repair, janitorial, guard services, product development, auxiliary production for a plant's own use (for example, power plant), recordkeeping, and other services closely associated with the above production operations. Source: https://www.bls.gov/opub/hom/ces/concepts.htm

[2]Nonsupervisory employees include those individuals in private, service-providing industries who are not above the working-supervisor level. This group includes supervised individuals such as office and clerical workers, repairers, salespersons, operators, drivers, physicians, lawyers, accountants, nurses, social workers, research aides, teachers, drafters, photographers, beauticians, musicians, restaurant workers, custodial workers, attendants, line installers and repairers, laborers, janitors, guards, and other employees at similar occupational levels whose primary work is providing services closely associated with those of the employees listed and whose primary work is not supervision of employees or management. Source:https://www.bls.gov/opub/hom/ces/concepts.htm

Comparing results in Tables 1a and 3, it can be seen that the volatility of growth in the AHE for total private industry (all employees) has only been modestly higher than that of the corresponding ECI. Note also that AHE growth was considerably higher than the corresponding ECI growth in a recession year like 2020 and a little slower in a recovery year like 2023. The volatility of the AHE for utilities was markedly greater than that of the corresponding utility ECI detailed in Table 1a.

Table 4 details the latest forecasts of wage rate index growth that are available from Power Planner, the CBO, and Moody's. Please note the following.

- These are all national indexes.
- Power Planner forecasts inflation in only a few labor price indexes. These are
  - AHEs of production and non-supervisory workers in the utility and electric power sectors
  - ECIs for private sector management, business and financial workers; professional, scientific and technical workers; and for professional and related workers. The latter two indexes have considerable overlap in the occupations that are covered.

Here are some notable results.

- Over the three-year 2024-26 period that is relevant for PSE's proposed MYRP, Power Planner forecasts the AHE for production and nonsupervisory workers in the utility industry to average about 3.57% annual growth while that for production and nonsupervisory workers in electric power generation, transmission, and distribution is forecasted to average 3.39% growth. The ECI for wages and salaries of professional and related workers is forecasted to average 3.10% growth while that for professional, scientific, and technical workers is forecasted to average 3.64% and that for management, business, and financial workers is forecasted to average 3.45% growth. Moody's forecasts the utilities industry AHE to average 3.74% growth during these same years.
- Over the three years from 2024 to 2026, the CBO forecasts the salaries and wages ECI for all private industry workers to average 3.79% average growth.
- All of these wage rate indexes are forecasted to grow more slowly in the following two years (2027-2028).

Table 4

National Private Sector Wage Rate Trends with Forecasts

Forecast Source	Power Planner[1]					Moody's[2]				Congressional Budget Office[3]
Wage Measure	Average Hourly Earnings, Private Industry, Production and Non-Supervisory		Employment Cost Index, Private Industry, Wages and Salaries			Average Hourly Earnings, Private Industry, Production and Non-Supervisory			Employment Cost Index, Private Industry, Wages and Salaries	
	Not Seasonally Adjusted		Not Seasonally Adjusted			Seasonally Adjusted		Not Seasonally Adjusted	Seasonally Adjusted	
Industry-Occupation	Utilities	Electric Power Generation Transmission and Distribution	Private, Management, Business, Financial	Professional, Scientific, and Technical Services	Private, Professional and Related	Utilities	All Employees	Professional and Business	All Workers	
YEAR					*Growth Rates*[4]					
2002	1.57%	2.71%	3.60%	1.47%	2.88%	1.57%	-	2.86%	3.16%	1.49%
2003	3.33%	4.27%	4.24%	1.92%	2.61%	3.33%	-	2.36%	2.80%	1.98%
2004	3.35%	3.20%	1.94%	3.71%	3.25%	3.35%	-	1.54%	2.62%	2.64%
2005	4.07%	4.21%	1.90%	1.69%	2.99%	4.07%	-	3.39%	2.45%	3.07%
2006	2.69%	2.61%	2.72%	3.13%	3.27%	2.69%	-	5.61%	2.88%	3.06%
2007	1.70%	3.09%	3.29%	4.18%	3.81%	1.70%	2.78%	5.20%	3.32%	2.67%
2008	3.38%	3.40%	3.21%	4.44%	3.19%	3.38%	3.08%	5.02%	2.92%	1.86%
2009	2.22%	1.59%	1.12%	1.74%	1.83%	2.22%	2.77%	5.35%	1.58%	0.66%
2010	1.88%	1.66%	1.97%	1.61%	1.42%	1.88%	1.84%	1.94%	1.60%	1.20%
2011	2.58%	2.39%	1.67%	2.53%	1.64%	2.58%	1.98%	1.50%	1.61%	2.05%
2012	2.51%	2.53%	1.69%	1.62%	1.78%	2.51%	1.87%	0.73%	1.80%	1.86%
2013	2.09%	1.82%	2.21%	1.64%	1.94%	2.09%	2.08%	1.82%	1.88%	1.75%
2014	1.81%	2.38%	2.28%	1.71%	1.80%	1.81%	2.05%	2.39%	2.01%	1.84%
2015	3.45%	3.23%	2.45%	2.35%	1.99%	3.45%	2.22%	2.07%	2.21%	0.96%
2016	3.77%	4.84%	2.47%	1.76%	1.89%	3.77%	2.54%	2.43%	2.34%	0.99%
2017	2.51%	3.75%	2.51%	2.18%	2.01%	2.51%	2.51%	2.40%	2.52%	1.91%
2018	1.48%	0.23%	2.63%	2.76%	2.48%	1.48%	2.99%	2.86%	2.99%	2.39%
2019	0.41%	-1.30%	2.53%	2.49%	2.22%	0.41%	3.23%	3.55%	2.90%	1.76%
2020	4.12%	2.22%	2.11%	2.91%	2.24%	4.12%	4.78%	5.16%	2.91%	1.34%
2021	3.92%	3.49%	2.86%	2.58%	2.91%	3.92%	4.16%	4.33%	3.92%	4.39%
2022	5.44%	5.79%	3.93%	4.59%	4.40%	5.44%	5.20%	6.35%	5.15%	5.15%
*2023**	4.93%	6.46%	3.78%	*4.39%*	4.15%	5.11%	4.19%	4.90%	4.43%	4.81%
2024	*4.33%*	*3.88%*	*4.02%*	*4.23%*	*3.48%*	*4.16%*	*3.35%*	*3.07%*	*3.38%*	*4.34%*
2025	*3.32%*	*3.28%*	*3.30%*	*3.67%*	*3.00%*	*3.61%*	*2.77%*	*3.00%*	*2.90%*	*3.66%*
2026	*3.06%*	*3.01%*	*3.02%*	*3.01%*	*2.84%*	*3.44%*	*2.70%*	*2.88%*	*2.71%*	*3.38%*
2027	*2.90%*	*2.85%*	*2.95%*	*3.02%*	*2.77%*	*3.38%*	*2.65%*	*2.85%*	*2.67%*	*3.28%*
2028	*2.79%*	*2.75%*	*2.98%*	*2.97%*	*2.76%*	*3.36%*	*2.64%*	*2.86%*	*2.65%*	*3.21%*
2029	*2.79%*	*2.76%*	*2.96%*	*2.99%*	*2.82%*	*3.39%*	*2.65%*	*2.92%*	*2.64%*	*3.17%*
2030	*2.75%*	*2.72%*	*2.94%*	*3.03%*	*2.81%*	*3.47%*	*2.68%*	*3.01%*	*2.68%*	*3.14%*
2031	*2.77%*	*2.77%*	*2.92%*	*2.96%*	*2.78%*	*3.59%*	*2.72%*	*3.11%*	*2.74%*	*3.12%*
2032	*2.80%*	*2.80%*	*2.91%*	*2.91%*	*2.79%*	*3.72%*	*2.78%*	*3.25%*	*2.81%*	*3.11%*
2033	*2.81%*	*2.81%*	*2.89%*	*2.95%*	*2.79%*	*3.91%*	*2.85%*	*3.44%*	*2.89%*	*3.10%*
Average Annual Growth Rates										
2003-2022 (20 growth rate years)	**2.84%**	**2.77%**	**2.49%**	**2.58%**	**2.48%**	**2.84%**	**NA**	**3.30%**	**2.62%**	**2.62%**
2008-2022 (15 growth rate years)	**2.77%**	**2.53%**	**2.38%**	**2.46%**	**2.25%**	**2.77%**	**2.89%**	**3.19%**	**2.56%**	**2.56%**
2013-2022 (10 growth rate years)	**2.90%**	**2.64%**	**2.60%**	**2.50%**	**2.39%**	**2.90%**	**3.18%**	**3.34%**	**2.88%**	**2.88%**
2024-2026	***3.57%***	***3.39%***	***3.45%***	***3.64%***	***3.10%***	***3.74%***	***2.94%***	***2.98%***	***3.00%***	***3.79%***
2027-2028	***2.84%***	***2.80%***	***2.96%***	***3.00%***	***2.77%***	***3.37%***	***2.65%***	***2.86%***	***2.66%***	***3.24%***
2024-2028	***3.28%***	***3.15%***	***3.25%***	***3.38%***	***2.97%***	***3.59%***	***2.82%***	***2.93%***	***2.86%***	***3.57%***
Standard Deviation of Growth Rates										
2008-2022 (15 growth rate years)	**1.25%**	**1.73%**	**0.67%**	**0.95%**	**0.76%**	**1.25%**	**1.06%**	**1.67%**	**0.98%**	**1.22%**
2003-2022 (20 growth rate years)	**1.16%**	**1.58%**	**0.76%**	**0.98%**	**0.80%**	**1.16%**	**NA**	**1.65%**	**0.86%**	**1.11%**

Forecasted results are italicized
*2023 numbers are a mix of actual and forecasted values as detailed in the numbered footnotes.

[1]Q3 2023 Forecast, October 2023, updated by PEG with actuals for Q3 for both AHEs and for the first two ECIs. Historical Power Planner, BLS, and CBO growth rates may differ slightly from each other in historical tables due to rounding in the indexes provided by each.
[2]October 2023 baseline forecast
[3]2023-2025 are the latest rates available from the July 2023 forecast; 2026-2033 rates are from the February 2023 forecast. The latest actual data incorporated into the CBO forecast are those released as of June 22, 2023.
[4]All growth rates are calculated logarithmically.

Using salary and wage cost shares provided by PSE and some of the latest Power Planner wage rate forecasts, we have constructed a custom forecast of national gas and electric wage rate growth.[8] The growth rate of this index is an S&W-weighted average of the growth rates of three subindexes. Table 5 provides results of these calculations and the corresponding wage rate inflation factors for PSE's cost projections. Over the three years from 2024 to 2026, Table 5 shows that our custom index is

[8] PEG used PSE's overall proportions of non-exempt (hourly union and union employees) and exempt management and scientific and technical salaries and wages to assign weights to the relevant Average Hourly Earnings and Employment Cost Index inflation which is forecasted by S&P.

expected to average 3.53% annual growth. In 2027 and 2028 the wage rate would grow somewhat slower, averaging 2.92% annually. Over the full five years wage rate growth would average 3.29%.

These forecasts are eligible for a regional inflation differential adjustment. We noted above that a reasonable inflation differential for wage rates of PSE is 0.35%. This would yield escalation for PSE's wage rates averaging 3.88% annually over the three-year 2024-2026 period and 3.64% annually for the five-year 2024-2028 period. The corresponding inflation factors are provided.

Table 5

Construction of Wage Rate Inflation Factors

S&P Private Sector Wage Rate Index Forecasts[1]				Custom-Weighted Summary G&E Wage Rate Index[2]	PSE Wage Rate Inflation Differential[3]	PSE Inflation-Differential-Adjusted Summary G&E Wage Rate Index	
Wage Rate Measure	Average Hourly Earnings[4]	Employment Cost Indexes for Wages & Salaries[5]					
Occupation	Production and Non-Supervisory Employees[6]	Management, Business, Financial[7]	Professional, Scientific, and Technical Services[8]				
Industry	Utilities[9]	All Private[10]	All Private[10]				
PSE Salary & Wage Shares	39.32%	41.84%	18.84%				
Year	Growth Rates	Growth Rates	Growth Rates	Growth Rates [A]	[B]	Growth Rates [A+B]	**Inflation Factors**
2023	4.93%	3.78%	4.39%	4.35%	0.35%	4.70%	**1.00000**
2024	4.33%	4.02%	4.23%	4.18%	0.35%	4.53%	**1.04639**
2025	3.32%	3.30%	3.67%	3.38%	0.35%	3.73%	**1.08614**
2026	3.06%	3.02%	3.01%	3.04%	0.35%	3.39%	**1.12356**
2027	2.90%	2.95%	3.02%	2.94%	0.35%	3.29%	**1.16117**
2028	2.79%	2.98%	2.97%	2.90%	0.35%	3.25%	**1.19957**
Average Annual Growth Rates							
2024-2026	3.57%	3.45%	3.64%	3.53%	0.35%	3.88%	
2027-2028	2.84%	2.96%	3.00%	2.92%	0.35%	3.27%	
2024-2028	3.28%	3.25%	3.38%	3.29%	0.35%	3.64%	

All growth rates are calculated logarithmically.

[1]Q3 2023 Forecasts

[2]This index is a combination of the 3 S&P Index Forecasts, weighted by the estimated percentage of PSE's 2022 salaries and wages falling into each category.

[3]This differential is calculated by subtracting the U.S. utility average weekly wage growth trend from the utility average weekly wage growth trend of 10 relevant counties in PSE's service territory, for each year. These county wage trends are first weighted by each one's percentage of total employed persons across the relevant counties. Finally, the wage growth trend differentials for the fifteen growth-rate years 2008 to 2022 are averaged to arrive at an average local wage growth differential.

[4]Original data source: Current Employment Statistics Survey. The Bureau of Labor Statistics Handbook, Chapter 2 says, "Average hourly earnings are on a "gross" basis. They reflect not only changes in basic hourly and incentive wage rates, but also such variable factors as premium pay for overtime and late-shift work and changes in output of workers paid on an incentive plan. They also reflect shifts in the number of employees between relatively high-paid and low-paid work and changes in workers' earnings in individual establishments. Averages for groups and divisions further reflect changes in average hourly earnings for individual industries. Averages of hourly earnings differ from wage rates. Earnings are the actual return to the worker for a stated period; rates are the amount stipulated for a given unit of work or time. The earnings series do not measure the level of total labor costs on the part of the employer because the following are excluded: benefits, irregular bonuses, retroactive items, payroll taxes paid by employers"

[5]Original data source: National Compensation Survey. The BLS defines the Employment Cost Index as follows: "The Employment Cost Index (ECI) measures the change in the hourly labor cost to employers over time. The ECI uses a fixed "basket" of labor to produce a pure cost change, free from the effects of workers moving between occupations and industries and includes both the cost of wages and salaries and the cost of benefits." Source: https://www.bls.gov/eci The BLS defines wages and salaries as follows: "Wage and salary workers are those who receive wages, salaries, commissions, tips, or payment in kind from a private-sector employer or from a local, state, or federal government agency or entity. This includes paid employees of charities, nonprofits, religious, and civic organizations. In the labor force, employment, and unemployment data published by the Bureau of Labor Statistics, most Current Population Survey (CPS) estimates of wage and salary workers include the incorporated self-employed. This is because, technically, the incorporated self-employed are paid employees of their corporation." Source: https://www.bls.gov/cps/definitions.htm#wagesalary

[6]Production and related employees in manufacturing and in mining and logging include working supervisors and all nonsupervisory employees (including group leaders and trainees) engaged in fabricating, processing, assembling, inspecting, receiving, storing, handling, packing, warehousing, shipping, trucking, hauling, maintenance, repair, janitorial, guard services, product development, auxiliary production for a plant's own use (for example, power plant), recordkeeping, and other services closely associated with the above production operations. Source: https://www.bls.gov/opub/hom/ces/concepts.htm

[7]The Occupational Employment and Wage Statistics Program defines Major Group 11-0000 as follows: "Management Occupations comprises the following occupations: Chief Executives; General and Operations Managers; Legislators; Advertising and Promotions Managers; Marketing Managers; Sales Managers; Fundraising Managers; Public Relations Managers; Facilities Managers; Administrative Services Managers; Computer and Information Systems Managers; Financial Managers; Industrial Production Managers; Purchasing Managers; Transportation, Storage, and Distribution Managers; Compensation and Benefits Managers; Human Resources Managers; Training and Development Managers; Farmers, Ranchers, and Other Agricultural Managers; Construction Managers; Education Administrators, All Other; Education and Childcare Administrators, Preschool and Daycare; Education Administrators, Postsecondary; Education Administrators, Kindergarten through Secondary; Architectural and Engineering Managers; Food Service Managers; Gambling Managers; Entertainment and Recreation Managers, Except Gambling; Lodging Managers; Medical and Health Services Managers; Natural Sciences Managers; Postmasters and Mail Superintendents; Property, Real Estate, and Community Association Managers; Social and Community Service Managers; Emergency Management Directors; Personal Service Managers, All Other; Funeral Home Managers; Managers, All Other" and Major Group 13-0000 as "Business and Financial Operations Occupations comprises the following occupations: Agents and Business Managers of Artists, Performers, and Athletes; Buyers and Purchasing Agents; Insurance Appraisers, Auto Damage; Claims Adjusters, Examiners, and Investigators; Compliance Officers; Cost Estimators; Farm Labor Contractors; Labor Relations Specialists; Human Resources Specialists; Logisticians; Project Management Specialists; Management Analysts; Meeting, Convention, and Event Planners; Fundraisers; Compensation, Benefits, and Job Analysis Specialists; Training and Development Specialists; Market Research Analysts and Marketing Specialists; Business Operations Specialists, All Other; Accountants and Auditors; Property Appraisers and Assessors; Budget Analysts; Credit Analysts; Financial Risk Specialists; Insurance Underwriters; Personal Financial Advisors; Financial and Investment Analysts; Financial Examiners; Credit Counselors; Loan Officers; Tax Examiners and Collectors, and Revenue Agents; Tax Preparers; Financial Specialists, All Other."

[8]The North American Industry Classification System used by the U.S. Census Bureau defines Sector 54 as follows: "The Professional, Scientific, and Technical Services sector comprises establishments that specialize in performing professional, scientific, and technical activities for others. These activities require a high degree of expertise and training. The establishments in this sector specialize according to expertise and provide these services to clients in a variety of industries and, in some cases, to households. Activities performed include: legal advice and representation; accounting, bookkeeping, and payroll services; architectural, engineering, and specialized design services; computer services; consulting services; research services; advertising services; photographic services; translation and interpretation services; veterinary services; and other professional, scientific, and technical services."

[9]The Utilities sector comprises establishments engaged in the provision of the following utility services: electric power, natural gas, steam supply, water supply, and sewage removal. Within this sector, the specific activities associated with the utility services provided vary by utility: electric power includes generation, transmission, and distribution; natural gas includes distribution; steam supply includes provision and/or distribution; water supply includes treatment and distribution; and sewage removal includes collection, treatment, and disposal of waste through sewer systems and sewage treatment facilities. Excluded from this sector are establishments primarily engaged in waste management services classified in Subsector 562, Waste Management and Remediation Services. These establishments also collect, treat, and dispose of waste materials; however, they do not use sewer systems or sewage treatment facilities.

[10]Private industry employees include most corporate officials, all executives, all supervisory personnel, all professionals, all clerical workers, many farmworkers, all wage earners, all pieceworkers, and all part-time workers. Workers on paid sick leave, paid holiday, paid vacation, and the like also are covered. Workers on the payroll of more than one firm during the period are counted by each employer that is subject to unemployment insurance (UI), as long as those workers satisfy the preceding definition of employment.

Material & Service Prices

Power Planner Indexes of Inflation

The BLS calculates producer price indexes ("PPIs") for a wide range of goods and services. These are based on reports by suppliers. Some of these indexes are relevant to the inflation in M&S prices that utilities face. Power Planner uses PPIs to construct and forecast M&S input price indexes for numerous granular electric O&M cost accounts (e.g., power distribution station expenses) that are detailed in FERC Form 1 and discussed in the FERC's supporting Uniform System of Accounts.[9] Power Planner also calculates analogous indexes for the granular gas O&M cost accounts in FERC Form 2 and its corresponding Uniform System of Accounts[10] that serve as a template for gas distributor reports to state utility commissions.

Power Planner uses these granular indexes to calculate and forecast *summary* M&S price indexes for several major expense categories (e.g., power distribution) in FERC Forms 1 and 2. Here are some Power Planner summary M&S price indexes for major expense categories that are relevant to this project.

Major Utility Expense Categories	Power Planner Summary M&S Price Indexes	Power Planner Variable Name
Electricity		
Fossil Steam Production	Steam Production Plant Total O&M	JEFOMMS
Hydroelectric Production	Hydro Production Plant Total O&M	JEHOMMS
Other (Non-Nuclear) Production	Other Production Plant Total O&M	JEOOMMS
Transmission	Transmission Plant Total O&M	JETOMMS
Distribution	Distribution Plant Total O&M	JEDOMMS
Customer Accounts	Electric Customer Accounts Operation	JECAOMS
A&G	Administrative & General Total O&M	JEADGOMMS

[9] S&P Global, Power Planner, Third Quarter 2023 and Code of Federal Regulations, Title 18, Volume 1, Part 101 – Uniform System of Accounts Prescribed for Public Utilities and Licensees Subject to the Provisions of the Federal Power Act. Accessed from: https://www.ecfr.gov/current/title-18/chapter-I/subchapter-C/part-101

[10] Ibid and Code of Federal Regulations, Title 18, Chapter I, Subchapter F, Part 201 – Uniform System of Accounts Prescribed for Natural Gas Companies Subject to the Provisions of the Natural Gas Act. Accessed from: https://www.ecfr.gov/current/title-18/chapter-I/subchapter-F/part-201

Gas		
Distribution	Distribution Expenses Total O&M	JGDOMMS
Customer Accounts	Gas Customer Accounts Operation	JGCAOMS
A&G	Administrative & General Total O&M	JGADGOMMS

Please note that Power Planner's summary M&S price indexes for gas and electric administrative and general ("A&G") inputs address price (unit cost) inflation in pensions and benefits as well as inflation in other A&G input prices.

Power Planner also calculates "topline" M&S price indexes that correspond to all electric and all gas utility O&M. The weights for these indexes are unlikely to closely mirror the mix of gas and electric services that PSE provides. Compared to many vertically-integrated electric utilities, for instance, the transmission services that PSE provides are small relative to the Company's distribution services. Moreover, PSE provides no gas transmission services.

Tables 6a and 6b detail historical trends and third quarter 2023 forecasts of future inflation in summary gas and electric M&S price indexes for major expense categories that are available from Power Planner. These tables also show trends in Power Planner's topline gas and electric M&S price indexes. Please note the following.

- Over the twenty years ending in 2022, inflation in Power Planner's M&S price indexes has generally been much more volatile than inflation in the national wage rate indexes presented above. M&S price declines (i.e., deflation) occurred in several historical years, and even in some forecasted years. Inflation in Power Planner's gas and electric topline M&S price indexes both exceeded 10% in 2022. Based on historical experience, it is therefore quite possible for Power Planner's M&S price inflation *forecasts* to differ considerably from their wage rate inflation forecasts for a period as short as the three years from 2024 to 2026.
- Over the longer sample periods considered, historical trends in Power Planner's summary M&S price indexes have been broadly similar to (though modestly slower than) historical trends in national wage rate indexes. Note also that the historical trends in M&S prices for individual O&M cost categories have varied considerably. Over the last 20 years ending in 2022, for example, inflation in gas and electric *distribution* M&S prices has been much greater than inflation in power *transmission* M&S prices.

Table 6a

Electric Utility Material and Service Price Indexes[1,2]

	Power Planner Summary Electric M&S Price Indexes								Power Planner Topline Electric M&S Price Index
	A&G	Hydro Production	Other Power Production	Steam Production	Transmission	Distribution	Customer Accounts	Customer Service & Information	
YEAR	Growth Rates[3]								
1991	3.82%	2.74%	2.71%	2.50%	2.00%	2.23%	4.90%	2.89%	3.05%
1992	3.69%	1.63%	1.65%	1.49%	2.31%	1.61%	2.02%	1.51%	2.36%
1993	3.93%	1.68%	1.86%	1.75%	1.11%	1.70%	1.45%	1.54%	2.36%
1994	2.54%	2.20%	2.31%	2.28%	1.88%	2.32%	2.00%	1.68%	2.23%
1995	3.60%	3.38%	3.15%	3.66%	3.34%	3.68%	6.27%	4.98%	3.92%
1996	3.51%	1.94%	1.85%	1.68%	1.28%	1.89%	1.67%	1.82%	2.34%
1997	3.59%	1.61%	1.48%	1.44%	2.39%	1.61%	1.21%	0.56%	2.17%
1998	1.96%	0.75%	1.35%	1.49%	0.92%	0.96%	1.40%	0.97%	1.43%
1999	2.08%	1.37%	1.70%	1.85%	0.51%	0.93%	1.88%	1.00%	1.54%
2000	3.28%	2.23%	1.99%	2.42%	0.33%	1.87%	2.58%	2.16%	2.42%
2001	3.37%	1.17%	1.26%	1.57%	0.13%	1.32%	2.37%	1.47%	2.08%
2002	3.87%	0.35%	0.53%	0.89%	-0.05%	0.37%	1.27%	0.08%	1.71%
2003	4.09%	2.21%	1.87%	2.49%	0.88%	1.42%	2.50%	1.13%	2.58%
2004	3.62%	3.60%	2.88%	4.21%	1.54%	4.83%	1.72%	1.60%	3.29%
2005	3.51%	5.52%	4.41%	5.32%	1.07%	4.85%	3.04%	3.42%	3.78%
2006	3.49%	6.32%	4.83%	5.46%	2.73%	5.53%	3.24%	2.55%	3.99%
2007	3.42%	4.03%	3.56%	3.69%	2.77%	4.22%	3.22%	2.66%	3.43%
2008	3.16%	7.04%	4.74%	5.16%	3.67%	7.52%	3.80%	3.67%	4.36%
2009	1.84%	-1.43%	0.47%	-0.57%	-1.29%	-2.57%	-0.15%	-0.44%	-0.02%
2010	2.07%	1.60%	0.20%	1.29%	0.25%	1.31%	1.97%	1.26%	1.51%
2011	2.15%	5.43%	3.66%	4.61%	2.53%	4.54%	3.42%	3.01%	3.23%
2012	1.80%	2.34%	2.44%	2.02%	1.64%	2.31%	2.61%	2.24%	2.00%
2013	1.90%	0.55%	1.25%	1.23%	0.86%	0.80%	2.45%	1.19%	1.42%
2014	1.78%	0.43%	0.76%	0.75%	0.40%	0.65%	2.24%	1.39%	1.25%
2015	1.79%	-1.44%	-0.01%	-0.24%	-0.75%	-0.81%	-0.07%	-0.52%	0.36%
2016	1.65%	-0.78%	0.10%	0.23%	-0.50%	-0.83%	1.14%	0.67%	0.66%
2017	1.35%	2.04%	1.68%	1.85%	0.69%	1.28%	1.86%	1.46%	1.44%
2018	1.63%	5.75%	4.43%	3.66%	2.90%	3.64%	3.10%	3.24%	2.77%
2019	2.07%	2.19%	2.47%	2.44%	2.21%	2.37%	2.91%	2.80%	2.33%
2020	1.07%	-0.90%	0.02%	0.35%	0.19%	0.04%	-0.68%	-1.72%	0.20%
2021	3.48%	7.20%	4.70%	7.02%	5.83%	9.91%	5.84%	6.21%	5.78%
2022	5.10%	13.37%	11.92%	11.75%	11.90%	15.58%	11.11%	13.75%	10.09%
2023*	*3.61%*	*3.96%*	*5.13%*	*4.24%*	*4.75%*	*4.76%*	*4.87%*	4.74%	*4.24%*
2024	*1.52%*	*-1.33%*	*-0.31%*	*-0.76%*	*-2.92%*	*-3.34%*	*-0.40%*	-2.79%	*-0.70%*
2025	*2.14%*	*0.08%*	*0.43%*	*0.30%*	*-0.45%*	*-1.47%*	*2.06%*	1.19%	*0.90%*
2026	*2.27%*	*1.39%*	*1.34%*	*1.29%*	*1.00%*	*0.68%*	*2.13%*	1.63%	*1.65%*
2027	*2.33%*	*1.51%*	*1.43%*	*1.54%*	*1.28%*	*1.20%*	*2.08%*	1.73%	*1.83%*
2028	*2.27%*	*1.57%*	*1.53%*	*1.69%*	*1.41%*	*1.38%*	*2.17%*	1.85%	*1.89%*
2029	*2.24%*	*1.65%*	*1.67%*	*1.80%*	*1.48%*	*1.53%*	*2.10%*	1.83%	*1.93%*
2030	*2.25%*	*1.73%*	*1.74%*	*1.87%*	*1.48%*	*1.65%*	*2.14%*	1.90%	*1.97%*
2031	*2.24%*	*1.76%*	*1.74%*	*1.89%*	*1.47%*	*1.65%*	*2.16%*	1.91%	*1.97%*
2032	*2.25%*	*1.80%*	*1.77%*	*1.93%*	*1.52%*	*1.71%*	*2.21%*	1.99%	*2.01%*
2033	*2.29%*	*1.82%*	*1.80%*	*1.96%*	*1.57%*	*1.72%*	*2.17%*	1.98%	*2.04%*
Average Annual Growth Rates									
1991-2022 (32 growth rate years)	2.82%	2.69%	2.44%	2.68%	1.74%	2.72%	2.63%	2.19%	2.57%
2003-2022 (20 growth rate years)	2.55%	3.25%	2.82%	3.14%	1.98%	3.33%	2.76%	2.48%	2.72%
2024-2026	*1.98%*	*0.05%*	*0.49%*	*0.28%*	*-0.79%*	*-1.37%*	*1.27%*	*0.01%*	*0.62%*
2027-2028	*2.30%*	*1.54%*	*1.48%*	*1.61%*	*1.34%*	*1.29%*	*2.13%*	*1.79%*	*1.86%*
2024-2028	*2.11%*	*0.64%*	*0.89%*	*0.81%*	*0.06%*	*-0.31%*	*1.61%*	*0.72%*	*1.11%*
Standard Deviation of Growth Rates									
2003-2022 (20 growth rate years)	1.09%	3.69%	2.76%	2.95%	2.87%	4.17%	2.46%	3.17%	2.31%

*2023 values are a mix of actual values and forecasts.
[1]Source: Power Planner Q3 2023 Forecast
[2]Forecasted results are italicized.
[3]All growth rates are calculated logarithmically.

Table 6b

Gas Utility Material and Service Price Indexes[1,2]

	Power Planner Summary Gas M&S Price Indexes						Power Planner Topline Gas M&S Price Index
	A&G	LNG Terminaling & Processing	Underground Storage	Distribution	Customer Accounts	Customer Service & Information	
YEAR	Growth Rates[3]						
1991	2.61%	2.47%	2.01%	3.23%	4.76%	2.97%	2.49%
1992	2.97%	1.33%	1.16%	2.00%	2.10%	1.81%	2.11%
1993	3.23%	1.64%	2.28%	2.03%	1.46%	1.52%	2.65%
1994	1.82%	2.17%	2.04%	1.73%	2.00%	1.69%	1.98%
1995	3.54%	4.32%	4.09%	3.40%	6.08%	4.91%	3.57%
1996	3.48%	1.96%	1.52%	2.49%	1.67%	1.71%	2.60%
1997	4.01%	0.93%	1.00%	1.47%	1.32%	1.11%	2.50%
1998	1.83%	0.54%	0.71%	0.63%	1.40%	1.08%	1.10%
1999	1.52%	1.25%	0.89%	1.67%	1.81%	0.86%	1.32%
2000	2.44%	3.03%	3.26%	3.83%	2.48%	1.68%	3.08%
2001	2.55%	1.59%	1.40%	2.13%	2.23%	1.21%	1.82%
2002	3.05%	0.58%	-0.08%	-0.19%	1.20%	0.14%	1.49%
2003	3.14%	2.45%	2.81%	3.94%	2.40%	1.17%	3.20%
2004	2.52%	4.93%	3.17%	4.23%	1.68%	1.34%	3.29%
2005	2.40%	6.40%	5.48%	6.11%	2.87%	2.56%	4.42%
2006	3.22%	5.57%	3.66%	2.90%	3.11%	2.22%	3.43%
2007	3.11%	3.40%	2.03%	2.79%	3.16%	2.46%	2.86%
2008	2.68%	8.00%	4.96%	6.42%	3.71%	3.30%	4.40%
2009	1.29%	-3.09%	-3.20%	-3.62%	-0.20%	-0.23%	-1.09%
2010	1.24%	2.85%	1.59%	2.49%	1.88%	1.09%	1.57%
2011	1.50%	5.78%	4.49%	3.97%	3.34%	2.75%	3.10%
2012	1.44%	2.10%	1.33%	1.73%	2.52%	2.07%	1.53%
2013	1.61%	0.87%	1.51%	1.84%	2.35%	1.29%	1.54%
2014	1.43%	1.37%	1.28%	2.08%	2.16%	1.35%	1.56%
2015	1.64%	-1.61%	-1.12%	-1.25%	-0.09%	-0.43%	0.25%
2016	1.27%	-0.27%	-0.37%	0.23%	1.10%	0.66%	0.59%
2017	1.29%	2.82%	2.48%	2.43%	1.81%	1.28%	1.91%
2018	1.47%	4.59%	4.00%	3.51%	3.07%	3.00%	2.82%
2019	2.01%	1.82%	1.16%	1.80%	2.87%	2.75%	1.62%
2020	0.77%	-1.08%	-1.05%	-0.65%	-0.70%	-1.05%	-0.10%
2021	4.24%	10.82%	9.12%	8.55%	5.76%	5.68%	7.00%
2022	4.94%	14.07%	13.14%	12.55%	11.07%	12.98%	10.35%
*2023**	*4.02%*	*1.51%*	*0.85%*	*1.26%*	*4.85%*	*4.85%*	*2.80%*
2024	*1.09%*	*-2.67%*	*-2.44%*	*-0.81%*	*-0.48%*	*-2.91%*	*-0.61%*
2025	*1.58%*	*-0.01%*	*0.58%*	*1.14%*	*2.01%*	*1.10%*	*1.02%*
2026	*1.79%*	*1.30%*	*1.50%*	*1.71%*	*2.11%*	*1.64%*	*1.62%*
2027	*1.90%*	*1.61%*	*1.60%*	*2.01%*	*2.07%*	*1.70%*	*1.76%*
2028	*1.91%*	*1.74%*	*1.70%*	*1.98%*	*2.15%*	*1.81%*	*1.83%*
2029	*1.90%*	*1.78%*	*1.71%*	*1.86%*	*2.08%*	*1.79%*	*1.86%*
2030	*1.91%*	*1.89%*	*1.75%*	*1.91%*	*2.12%*	*1.84%*	*1.90%*
2031	*1.91%*	*1.92%*	*1.79%*	*2.01%*	*2.14%*	*1.84%*	*1.93%*
2032	*1.93%*	*1.98%*	*1.88%*	*2.10%*	*2.19%*	*1.92%*	*1.99%*
2033	*1.98%*	*2.00%*	*1.93%*	*2.15%*	*2.15%*	*1.93%*	*2.04%*
Average Annual Growth Rates							
1991-2022 (32 growth rate years)	2.38%	2.92%	2.40%	2.70%	2.57%	2.09%	2.53%
2003-2022 (20 growth rate years)	2.16%	3.59%	2.82%	3.10%	2.69%	2.31%	2.71%
2024-2026	*1.49%*	*-0.46%*	*-0.12%*	*0.68%*	*1.21%*	*-0.06%*	*0.68%*
2027-2028	*1.91%*	*1.67%*	*1.65%*	*1.99%*	*2.11%*	*1.76%*	*1.80%*
2024-2028	*1.65%*	*0.39%*	*0.59%*	*1.21%*	*1.57%*	*0.67%*	*1.12%*
Standard Deviation of Growth Rates							
2003-2022 (20 growth rate years)	1.10%	4.16%	3.64%	3.52%	2.46%	2.92%	2.55%

*2023 values are a mix of actual values and forecasts.
[1]Source: Power Planner Q3 2023 Forecast
[2]Forecasted results are italicized.
[3]All growth rates are calculated logarithmically.

Adjusting Power Planner's M&S Inflation Estimates

We believe that the volatility of inflation in Power Planner's M&S price indexes reflects an unsatisfactory treatment of prices that utilities pay for services. The FERC Form 1 does not itemize the cost of most services and, absent knowledge of this, the cost-share weights that Power Planner uses on service price inflation are likely to be too low. Power Planner's documentation of their methodology indicates that their method for calculating M&S price indexes has not been updated since 2012. Over the years, many energy utilities have increased the share of O&M expenses they pay for services due to greater reliance on outsourcing and affiliate transactions. PSE makes extensive use of outsourcing in O&M activities that include vegetation management. The weight on services matters because the costs of many services that utilities purchase have a sizable labor component and wage rate inflation should generally stabilize and accelerate service price inflation.

Power Planner's summary M&S price index for A&G does seem to capture inflation in prices of many professional (e.g., attorney) services, the cost of which utilities report as A&G expenses. However, we believe that Power Planner's methodology for calculating M&S price indexes for other activities (e.g., power distribution) does not give proper weight to service price inflation. Based on our analysis, we believe that it is reasonable to represent M&S price inflation for gas and electric activities other than A&G as weighted averages of inflation in Power Planner's M&S price indexes for these activities and a supplemental service price index that we designed. To calculate such "corrected" M&S price indexes for ex A&G activities, we used cost shares for materials and outsourced services during the forecast period that were drawn from PSE cost forecasts.

We assume that inflation in prices of these outsourced services is a weighted average of inflation in Power Planner's M&S price indexes, a capital price index, and our custom wage rate index. A capital price index is included because many service providers incur material costs to use capital equipment. For example, tree trimmers need bucket trucks. We use the GDP implicit price deflator ("GDP-IPD") as a proxy for capital price inflation.

The weight assigned to labor price inflation is 2/3 while each of capital and M&S price inflation are assigned 1/6 weights. Labor price inflation should include a 0.35% regional inflation differential. Corrected M&S price inflation is then effectively a weighted average of inflation in Power Planner M&S price indexes, the GDP-IPD, and wage rate inflation.

Results of these calculations for electric and gas services can be found in Tables 7a and 7b respectively. Here are some notable results in the electric table.

- Power Planner's topline index for electric M&S prices is expected to average only 0.62% annual inflation over the three years from 2024 to 2026 and 1.11% over the five-year 2024-2028 period. Both of these averages are materially slowed by Power Planner's forecast of negative M&S price inflation in 2024. In the four years after 2024 (2025-2028), these prices are expected to average 1.57% annual growth using the Power Planner topline index.
- PEG's corrected custom topline electric M&S price index is expected to average 1.61% annual growth during the three years from 2024 to 2026 and 1.85% growth over the five years from 2024 to 2028.

The following results are salient in the analogous gas table (Table 7b).

- Power Planner's topline index gas M&S prices is forecasted to average only 0.68% annual inflation over the three years from 2024 to 2026 and 1.12% over the five-year 2024-2028 period. Both of these averages are materially slowed by Power Planner's forecast of negative M&S price inflation in 2024. In the four years after 2024 (2025-2028), these prices are forecasted to average 1.56% annual growth using the Power Planner topline index.
- PEG's corrected custom topline gas M&S price index is expected to average 1.79% annual growth during the three years from 2024 to 2026 and 1.97% growth over the five years from 2024 to 2028.

Table 7a

Calculation of Alternative M&S Inflation Measures: Electric

	Forecast Year					Average Annual Growth Rates		
	2024	2025	2026	2027	2028	2024-2026 3 years	2025-2028 4 years	2024-2028 5 years
Summary M&S Price Indexes for Major Expense Categories (Power Planner)								
Steam Generation	-0.76%	0.30%	1.29%	1.54%	1.69%	**0.28%**	**1.20%**	**0.81%**
Hydro Power Generation	-1.33%	0.08%	1.39%	1.51%	1.57%	**0.05%**	**1.14%**	**0.64%**
Other Power Generation	-0.31%	0.43%	1.34%	1.43%	1.53%	**0.49%**	**1.18%**	**0.89%**
Transmission	-2.92%	-0.45%	1.00%	1.28%	1.41%	**-0.79%**	**0.81%**	**0.06%**
Distribution	-3.34%	2.38%	-3.16%	1.20%	1.38%	**-1.37%**	**0.45%**	**-0.31%**
Customer Accounts	-0.40%	2.06%	2.13%	2.08%	2.17%	**1.27%**	**2.11%**	**1.61%**
Customer Service	-2.79%	1.19%	1.63%	1.73%	1.85%	**0.01%**	**1.60%**	**0.72%**
Administrative and General	1.52%	2.14%	2.27%	2.33%	2.27%	**1.98%**	**2.25%**	**2.11%**
Power Planner Topline Electric M&S Index	-0.70%	0.90%	1.65%	1.83%	1.89%	**0.62%**	**1.57%**	**1.11%**
Corrected Topline M&S Index (includes A&G)	**1.05%**	**2.17%**	**1.61%**	**2.19%**	**2.22%**	**1.61%**	**2.05%**	**1.85%**
Indicated Inflation Factor	1.01057	1.03277	1.04953	1.07277	1.09682			

Note: All growth rates are calculated logarithmically.

Table 7b

Calculation of Alternative M&S Inflation Measures: Gas

	Forecast Year					Average Annual Growth Rates		
	2024	2025	2026	2027	2028	2024-2026 3 years	2025-2028 4 years	2024-2028 5 years
Summary M&S Price Indexes for Major Expense Categories (Power Planner)								
Underground Storage	-2.44%	0.58%	1.50%	1.60%	1.70%	**-0.12%**	**1.35%**	**0.59%**
LNG	-2.67%	-0.01%	1.30%	1.61%	1.74%	**-0.46%**	**1.16%**	**0.39%**
Distribution	-0.81%	1.14%	1.71%	2.01%	1.98%	**0.68%**	**1.71%**	**1.21%**
Customer Accounts	-0.48%	2.01%	2.11%	2.07%	2.15%	**1.21%**	**2.08%**	**1.57%**
Customer Service	-3.27%	0.99%	1.56%	1.63%	1.76%	**-0.24%**	**1.48%**	**0.53%**
Administrative and General	1.08%	0.00%	3.36%	1.90%	1.91%	**1.48%**	**1.79%**	**1.65%**
Power Planner Topline Gas M&S Index	-0.61%	1.02%	1.62%	1.76%	1.83%	**0.68%**	**1.56%**	**1.12%**
Corrected Topline M&S Index (includes A&G)	**1.24%**	**1.37%**	**2.75%**	**2.24%**	**2.25%**	**1.79%**	**2.15%**	**1.97%**
Indicated Inflation Factor	1.01247	1.02640	1.05506	1.07892	1.10347			

Note: All growth rates are calcualted logarithmically.

Construction Cost Inflation

Baltimore-based Whitman, Requardt and Associates has for many decades calculated indexes of gas and electric utility construction costs.[11] These "Handy Whitman" indexes are available for detailed utility asset categories in the following six regions.

North Atlantic

South Atlantic

North Central

South Central

[11] *The Handy-Whitman Index of Public Utility Construction Costs: Trends of Construction Costs*, various issues.

Plateau

Pacific

The Pacific region indexes are most relevant for PSE.

There are indexes for many of the granular gross plant addition categories detailed in Accounts 301-399 of FERC Form 1 (for electric utilities) and Accounts 301-399 of FERC Form 2 (for gas utilities). Additionally, summary Handy Whitman construction cost indexes are calculated for each region for some broader utility asset categories. Growth of these summary electric indexes and many granular gas and electric utility construction cost indexes are forecasted by Power Planner. Details on available summary indexes are provided in the box below. Neither Whitman, Requardt and Associates nor Power Planner publishes a summary *gas* distribution construction cost index or forecast but PEG has constructed one.

Major Utility Asset Category	Summary Construction Cost Indexes	Power Planner Variable Name
Electricity		
Fossil Steam Production	Total Steam Production Plant	JUEPPF@PCF
Hydro Production	Total Hydraulic Production Plant	JUEPPH@PCF
Other (Non-Nuclear) Production	Total Other Production Plant	JUEPPO@PCF
Transmission	Total Transmission Plant	JUEPT@PCF
Distribution	Total Distribution Plant	JUEPD@PCF
Gas		
Distribution	Not available	Not available

Historical trends and Power Planner forecasts of the summary electric construction cost indexes for the Pacific region can be found in Table 8. The historical sample period is 2004-22.

Table 8

Historical and Forecasted Utility Construction Cost Inflation: Electric (Pacific Region)

Year	Total Steam Production Plant	Total Other (Non-Nuclear) Production Plant	Total Hydraulic Production Plant	Total Transmission Plant	Total Distribution Plant
	Growth Rates				
2003					
2004	3.81%	0.70%	3.98%	7.07%	5.58%
2005	5.28%	2.02%	4.52%	7.39%	7.05%
2006	4.47%	6.46%	3.84%	8.13%	9.96%
2007	4.94%	12.07%	4.98%	7.70%	9.82%
2008	6.70%	10.43%	5.07%	7.81%	8.90%
2009	-0.57%	6.81%	-0.05%	-2.32%	2.25%
2010	4.31%	4.79%	3.14%	3.18%	4.14%
2011	3.56%	3.51%	2.27%	3.12%	4.13%
2012	3.28%	7.15%	2.11%	1.21%	3.40%
2013	1.37%	2.86%	1.67%	1.89%	3.55%
2014	1.43%	3.52%	1.59%	1.74%	3.10%
2015	4.46%	2.97%	2.63%	2.05%	2.32%
2016	3.10%	3.76%	2.52%	2.08%	1.55%
2017	0.39%	4.22%	1.58%	2.28%	3.63%
2018	3.37%	4.74%	3.18%	4.88%	4.80%
2019	2.30%	3.74%	3.26%	2.88%	3.91%
2020	3.25%	5.27%	5.06%	1.68%	4.78%
2021	11.48%	6.89%	12.08%	4.18%	5.66%
2022	9.67%	12.88%	10.71%	11.68%	13.89%
2023	*5.29%*	*13.35%*	*2.82%*	*11.35%*	*18.31%*
2024	*0.83%*	*8.59%*	*0.46%*	*3.03%*	*6.33%*
2025	*1.42%*	*9.09%*	*0.44%*	*0.12%*	*3.12%*
2026	*0.38%*	*4.66%*	*0.79%*	*-0.62%*	*1.15%*
2027	*0.31%*	*1.06%*	*0.79%*	*-0.88%*	*0.54%*
2028	*0.46%*	*-1.04%*	*0.94%*	*-0.24%*	*1.07%*
Annual Average Growth Rates					
2004-2022 (19 years)	**4.03%**	**5.51%**	**3.90%**	**4.14%**	**5.39%**
2004-2023 (20 years)	**4.09%**	**5.91%**	**3.85%**	**4.50%**	**6.04%**
2024-2026	***0.87%***	***7.45%***	***0.57%***	***0.85%***	***3.53%***
2027-2028	***0.38%***	***0.01%***	***0.87%***	***-0.56%***	***0.80%***
2024-2028	***0.68%***	***4.47%***	***0.69%***	***0.28%***	***2.44%***
Standard Deviation of Growth Rates					
2004-2022 (19 growth rate years)	**2.90%**	**2.87%**	**2.98%**	**3.35%**	**3.19%**

Source: S&P Power Planner Q3 2023 Forecast, Pacific Region (October 2023), updated by PEG with Handy Whitman index July 2023 actuals

All growth rates are calculated logarithmically.

Forecasted results are italicized.

With regard to Table 8, please note the following.

- As measured by the standard deviation of growth rates, inflation in these construction cost indexes has also been much more volatile than that in labor price indexes that we have presented. Those for power transmission and distribution assets tend to be especially sensitive to prices of the metals (e.g., steel and aluminum) used in their construction. Prices of these metals have long been sensitive to world market conditions such as economic growth in China.
- Price declines occurred rarely during the historical period, but a few declines are forecasted to occur in the next five years. It would not be surprising, then, for forecasts of utility construction cost inflation to differ markedly from forecasts of labor price inflation for a period as short as three years.
- The long-run historical trends in the construction costs of the various asset classes vary considerably. For example, construction costs have grown more rapidly for power distribution than for transmission. We should not then be surprised to discover that the forecasted trends in the next five years vary considerably as well.

Table 9a shows the calculation of electric utility construction cost inflation factors for the 2024-2028 period. Each major asset category has its own inflation factor, and PSE used these in its revenue requirement projections. We also calculated a topline electric utility construction cost index using custom weights drawn from a PSE capex forecast.[12]

Examining the results in Table 9a, it can be seen that there are material differences in the forecasted growth rates of various kinds of electric construction costs. Inflation in the (unit) construction cost of power distribution and of other power generation plant is forecasted to be especially rapid, while that for power transmission plant is forecasted to be much slower. PSE plans to make large power distribution investments during the 2025 to 2026 MYRP. The Company's (unit) electric construction costs are forecasted to average 5.22 percent annual growth over the three-year 2024-2026 period. Electric construction costs are generally expected to grow more slowly after 2026 and to average 3.27 percent annually over the five-year 2024-2028 period.

[12] The capex forecast used for this purpose was not the final capex forecast but it was not materially different from the capex forecast that was approved by the PSE Board of Directors.

Table 9a

Electric Construction Cost Inflation Factors

Year	Total Other (Non-nuclear) Production			Total Hydraulic Production			Total Transmission			Total Distribution		
	PSE Capex Weights	Growth Rates	Inflation Factors	PSE Capex Weights	Growth Rates	Inflation Factors	PSE Capex Weights	Growth Rates	Inflation Factors	PSE Capex Weights	Growth Rates	Inflation Factors
	[A]	[B]		[C]	[D]		[E]	[F]		[G]	[H]	
2023			1.00000			1.00000			1.00000			1.00000
2024	42.33%	8.59%	1.08973	10.62%	0.46%	1.00465	9.94%	3.03%	1.03076	37.10%	6.33%	1.06540
2025	57.28%	9.09%	1.19344	3.50%	0.44%	1.00911	7.56%	0.12%	1.03202	31.67%	3.12%	1.09912
2026	58.93%	4.66%	1.25042	3.56%	0.79%	1.01714	6.63%	-0.62%	1.02568	30.88%	1.15%	1.11179
2027	32.82%	1.06%	1.26374	6.02%	0.79%	1.02519	11.78%	-0.88%	1.01669	49.37%	0.54%	1.11777
2028	10.22%	-1.04%	1.25066	5.46%	0.94%	1.03491	19.46%	-0.24%	1.01420	64.86%	1.07%	1.12975
Average Annual Growth Rates												
2024-2026		**7.45%**			**0.57%**			**0.85%**			**3.53%**	
2027-2028		**0.01%**			**0.87%**			**-0.56%**			**0.80%**	
2024-2028		**4.47%**			**0.69%**			**0.28%**			**2.44%**	

PSE Custom Weighted Summary Electric Construction Cost Index		
Year	Growth Rates	Inflation Factors
	[I] = [A*B+C*D+ E*F+G*H]	
2023		**1.00000**
2024	6.34%	**1.06544**
2025	6.22%	**1.13379**
2026	3.09%	**1.16937**
2027	0.56%	**1.17590**
2028	0.59%	**1.18284**
Average Annual Growth Rates		
2024-2026	**5.22%**	
2027-2028	**0.57%**	
2024-2028	**3.36%**	

Notes

All growth rates are calculated logarithmically.

Source for growth rates: S&P Power Planner Q3 2023 Forecast, Pacific Region (October 2023), updated by PEG with Handy Whitman Index July 2023 actuals

Calculation of gas utility construction cost inflation factors is detailed in Table 9b. We provide these factors for granular capex categories and also present a summary index and inflation factor that applies to all gas utility capex.

Inspection of Table 9b reveals that the growth in gas utility construction cost is forecasted to be much slower than the growth in most electric utility construction costs. Gas utility construction costs are expected to average a slight 0.10% annual decline over the three years from 2024 to 2026 and to then grow slowly in 2027 and 2028. Growth is expected to average only 0.12% annually over the five-year 2024-2028 period.

Table 9b

Gas Construction Cost Inflation Factors

Year	Plastic Mains PSE Capex Weights	Plastic Mains Growth Rates	Plastic Mains Inflation Factors	Steel Mains PSE Capex Weights	Steel Mains Growth Rates	Steel Mains Inflation Factors	Measuring & Regulating Station Equipment PSE Capex Weights	Measuring & Regulating Station Equipment Growth Rates	Measuring & Regulating Station Equipment Inflation Factors
	[A]	[B]		[C]	[D]		[E]	[F]	
2023			1.00000			1.00000			1.00000
2024	46.45%	1.16%	1.01163	9.42%	-5.56%	0.94591	5.30%	-4.68%	0.95427
2025	46.52%	-2.12%	0.99044	9.44%	-1.01%	0.93640	5.26%	0.28%	0.95693
2026	46.42%	-1.25%	0.97818	9.42%	1.05%	0.94624	5.57%	0.54%	0.96207
2027	46.50%	-0.24%	0.97579	9.43%	0.80%	0.95386	5.51%	0.46%	0.96653
2028	46.80%	0.25%	0.97826	9.49%	0.65%	0.96008	4.92%	0.85%	0.97474
Average Annual Growth Rates									
2024-2026		**-0.74%**			**-1.84%**			**-1.29%**	
2027-2028		**0.00%**			**0.73%**			**0.65%**	
2024-2028		**-0.44%**			**-0.81%**			**-0.51%**	

Year	Plastic Services PSE Capex Weights	Plastic Services Growth Rates	Plastic Services Inflation Factors	Meters PSE Capex Weights	Meters Growth Rates	Meters Inflation Factors	Meter Installations PSE Capex Weights	Meter Installations Growth Rates	Meter Installations Inflation Factors
	[G]	[H]		[I]	[J]		[K]	[L]	
2023			1.00000			1.00000			1.00000
2024	36.84%	2.27%	1.02298	1.91%	0.51%	1.00508	0.08%	-6.41%	0.93789
2025	36.89%	1.24%	1.03580	1.82%	-0.16%	1.00350	0.08%	-0.82%	0.93028
2026	36.82%	0.44%	1.04033	1.70%	-0.10%	1.00253	0.07%	1.02%	0.93980
2027	36.88%	0.91%	1.04987	1.61%	-0.76%	0.99496	0.07%	0.63%	0.94572
2028	37.12%	1.02%	1.06065	1.59%	-0.06%	0.99438	0.07%	0.46%	0.95011
Average Annual Growth Rates									
2024-2026		**1.32%**			**0.08%**			**-2.07%**	
2027-2028		**0.97%**			**-0.41%**			**0.55%**	
2024-2028		**1.18%**			**-0.11%**			**-1.02%**	

PSE Custom Weighted Summary Gas Construction Cost Index		
Year	Growth Rates	Inflation Factors
	[M] = [A*B] + [C*D]+ [E*F]+ [G*H] + [I*J] + [K*L]	
2023		**1.00000**
2024	0.61%	**1.00608**
2025	-0.61%	**0.99997**
2026	-0.29%	**0.99707**
2027	0.31%	**1.00019**
2028	0.60%	**1.00621**
Average Annual Growth Rates		
2024-2026	**-0.10%**	
2027-2028	0.46%	
2024-2028	0.12%	

Notes

All growth rates are calculated logarithmically.

Source for growth rates: S&P Power Planner Q3 2023 Forecast, Pacific Region (October 2023), updated by PEG with Handy Whitman Index July 2023 actuals

General and Intangible Plant

PSE's general plant and intangible plant capex are expected to account for small but material shares of the Company's total capex during the proposed MYRP. Intangible plant and general plant are not readily attributable to a particular area of operation. PSE has indicated that its expenditures on intangible plant during the proposed MYRP will consist chiefly of software.

General plant consists of other assets that are not easily classified into functional categories. The Uniform System of Accounts descriptions of general plant can aid us in choosing appropriate inflation indexes. Those descriptions mention office buildings, furniture, communications equipment, computers, vehicles, laboratory equipment, shop tools, power-operated equipment, and stores equipment. PSE has indicated that computers and communications equipment are the biggest areas of expected general plant expenditures during the proposed plan.

In most of our previous utility cost research we have used the Handy Whitman Index for office buildings as an inflation index for general plant additions. However, Handy Whitman does not have good inflation indexes for other kinds of general plant or for intangible plant. Thus, we have to rely chiefly on price indexes from other sources. Another complication in developing price escalators for general plant and intangible plant is that forecasts of these alternative price indexes are not to our knowledge available.

We have based our forecasts on the average annual inflation of the chosen price indexes over the last ten years or the longest period available if shorter. Using forecasted capex shares specific to PSE, we computed weighted averages of growth rates in a selection of relevant inflation indexes for intangible plant and general plant. Most of the inflation subindexes were PPIs calculated by the BLS. Based on this research we recommend annual inflation assumptions of 1% for each of general plant and intangible plant.

Macroeconomic Inflation

Macroeconomic price indexes summarize inflation in prices of goods and services sold in broad sectors of the economy (such as consumer products). The following macro price indexes are especially notable in the context of utility ratemaking.

CPI-U The CPI-U (all items) is a well-known index calculated by the BLS of prices paid by urban consumers. Forecasts of CPI-U inflation are readily available from respected sources. Urban consumers currently constitute around 93% of the U.S. population. CPI-U results are available for the Seattle metro

area. The CPI-U has heavy weights on food (currently around 13%), energy (7%), and shelter (34%) prices.[13] Inflation in these prices has little direct impact on utility expenditures on base rate inputs.

The CPI-U is drawn entirely from consumer surveys and does not include prices or expenditures by government, businesses, or nonprofit organizations *on behalf of* consumers. Health insurance is a notable example. The CPI-U measures inflation in health care costs that consumers pay directly but not inflation in health care costs that are paid by employers or government agencies.

Since January 2023, CPI-U weights have been recalculated annually using one year of expenditure data. Previously, the BLS updated the weights every other year using two years of data. Revisions to the CPI-U are limited to seasonal adjustments to monthly results (and those only for the last five years). The weights on subindexes are not revised retrospectively.

CPIs have rarely been used in the attrition relief mechanisms of American MYRPs. In Canada, however, provincial CPIs have been used along with wage rate indexes to measure inflation in the attrition relief mechanisms of several MYRPs for energy utilities.

Core CPI The core CPI excludes the volatile prices of food and energy. However, the weight on shelter is thereby increased, currently to 44%. Historical data on core CPI inflation are available for the Seattle area. Forecasts are readily available for inflation in the national core CPI but not to our knowledge for inflation in its Seattle counterpart.

Supercore CPIs The BLS also calculates "special aggregate" CPIs that include so-called "supercore" CPIs. One of these indexes excludes prices of food, energy, and shelter. Another of these indexes also excludes prices for used cars and trucks. Both of these supercore indexes have been calculated back to 1967. However, to our knowledge forecasts are not readily available for either of these indexes even though they are increasingly relevant in macroeconomic policymaking. Seattle-Tacoma versions of these indexes are not to our knowledge publicly available but rough calculations can be made from the available data.

PCE PI The personal consumption expenditures ("PCE") price index is calculated by the BEA. It has lower weights on energy, food, and shelter than the CPI-U (all items) because it includes items purchased on behalf of consumers (e.g., life insurance, pensions, and health insurance). It covers the

[13] Energy prices in the CPI-U address those that consumers pay for gasoline and other motor fuels, lubricants and fluids, fuel oil, and electricity and natural gas service.

entire U.S. population (not just urban areas). The weights and composition of the various consumer goods and services in the index are time-variant, which improves accuracy.

Estimates of PCE PI inflation are revised periodically, and historical revisions or changes are not limited. The PCE PI draws from various data sources that include the U.S. Census Bureau and the BLS. National Health Expenditures Account costs are sourced from the suppliers' perspective.

Core PCE PI A core PCE is also available that excludes food and energy prices. This index is available historically and forecasts are available for the nation. Supercore PCE and regional core PCE indexes are not readily available through the BEA to our knowledge.

GDP-PI The GDP-PI is the federal government's featured index of inflation in the U.S. economy's final goods and services. Weights on food, energy, and shelter price inflation are considerably lower than in the CPI-U (all items) for two reasons.

- The GDP-PI uses the PCE to measure consumer price inflation, not the CPI. We noted above that the PCE includes a broader range of consumer products (e.g., more medical services).
- The GDP-PI includes prices of capital equipment and other gross domestic product investments whereas the CPI excludes investment items.

Weights on the various prices covered by the GDP-PI are time-variant and this enhances measurement accuracy.

Estimates of GDP-PI inflation may be revised periodically for several years. Initial estimates of 2024 GDP-PI inflation will not be available until late January, second estimates will not be available until late February, and third estimates will not be available until late March. Further revisions may occur due to refinements in macroeconomic data and calculations.

The GDP-PI has been used in numerous American MYRPs as the inflation measure in a rate or revenue cap index. It has also been used in many studies of U.S. utility input price and productivity trends as a proxy for M&S price inflation.

Table 10 provides historical trends in macroeconomic price indexes that are particularly relevant for PSE ratemaking. These include the GDP-PI, the closely-related GDP-IPD,[14] and the supercore CPI for the U.S. that excludes food, shelter, and energy. Please note the following.

- We compare the volatility of alternative inflation measures using the standard deviation of their annual growth rates. Examining the national inflation results it can be seen that, over the twenty most recent completed historical growth rate years (2003-22), the volatility of the GDP-PI, GDP-IPD, and the national supercore CPI that excluded structures was materially less than that of the CPI-U (all items) and there were no price declines in these three indexes. The volatility of the national core CPI and of the supercore CPI that also excluded used cars and trucks was even lower.

- Inflation using the various macro indexes varied quite a bit in the short run but the twenty-year trends in the GDP-PI, GDP-IPD, CPI-U (all items), and Core CPI were fairly similar in the long run. Note that CPI-U (all items) inflation was well above that of the other national macroeconomic inflation measures in 2022.

- Inflation in the Seattle-Tacoma CPI-U (all items) and core CPI-U tended to be more rapid than that for the corresponding U.S. indexes. However, this was likely due chiefly to more rapid inflation in the Seattle area's shelter prices. A recent *Wall Street Journal* article highlighted the rapid growth in Seattle shelter prices.[15]

- Inflation in the GDP-PI and GDP-IPD differs slightly from year to year but the longer-term trends are nearly the same.

[14] The BEA uses the GDP-IPD to calculate real GDP growth.

[15] "Despite Record Home Prices, Housing is About to Drag Inflation Down", *Wall Street Journal,* December 16, 2023.

Table 10

Historical Trends of Macroeconomic Price Indexes[1]

	United States						West Region[2,10]		Seattle-Tacoma-Bellevue Metropolitan Statistical Area[3,9,10]	
					Supercore CPI-U					
	GDP-PI[4]	GDP - IPD[5]	CPI-U[6] all items	Core CPI-U[7]	less Structures[8]	less Structures, Used Cars & Trucks[9]	CPI-U all items	Core CPI-U	CPI-U all items	Core CPI-U
	Growth Rates									
Year										
2001	2.28%	2.23%	2.81%	2.61%	1.98%	1.96%	3.60%	3.19%	3.56%	2.97%
2002	1.49%	1.54%	1.57%	2.34%	1.33%	1.60%	1.91%	2.31%	1.92%	2.32%
2003	1.98%	1.96%	2.25%	1.41%	0.82%	1.14%	2.09%	1.34%	1.57%	0.71%
2004	2.64%	2.65%	2.63%	1.74%	1.09%	1.45%	2.31%	1.53%	1.24%	0.15%
2005	3.07%	3.09%	3.33%	2.16%	1.88%	1.74%	3.01%	2.20%	2.79%	1.76%
2006	3.06%	3.04%	3.17%	2.46%	1.84%	1.87%	3.36%	2.92%	3.63%	3.23%
2007	2.67%	2.67%	2.81%	2.32%	1.35%	1.56%	3.13%	2.67%	3.81%	3.48%
2008	1.86%	1.91%	3.77%	2.27%	2.11%	2.26%	3.43%	2.36%	4.12%	3.35%
2009	0.66%	0.62%	-0.36%	1.68%	2.13%	2.42%	-0.38%	1.24%	0.58%	2.12%
2010	1.19%	1.21%	1.63%	0.95%	1.93%	1.51%	1.08%	0.34%	0.29%	-0.49%
2011	2.04%	2.04%	3.11%	1.64%	1.89%	1.78%	2.80%	1.51%	2.64%	1.28%
2012	1.85%	1.85%	2.05%	2.09%	2.05%	2.11%	2.13%	2.00%	2.50%	2.55%
2013	1.71%	1.69%	1.45%	1.75%	1.36%	1.43%	1.47%	1.75%	1.21%	1.52%
2014	1.73%	1.73%	1.61%	1.73%	0.97%	1.04%	1.84%	1.99%	1.83%	1.94%
2015	0.87%	0.92%	0.12%	1.81%	0.94%	1.02%	1.16%	2.34%	1.35%	2.54%
2016	0.95%	0.95%	1.25%	2.19%	1.35%	1.50%	1.91%	2.83%	2.19%	2.90%
2017	1.81%	1.77%	2.11%	1.83%	0.77%	0.98%	2.80%	2.77%	3.01%	2.77%
2018	2.26%	2.27%	2.41%	2.12%	1.27%	1.32%	3.29%	2.99%	3.16%	2.99%
2019	1.67%	1.66%	1.80%	2.17%	1.34%	1.36%	2.66%	2.82%	2.51%	2.77%
2020	1.34%	1.31%	1.23%	1.69%	1.15%	1.02%	1.73%	2.01%	1.68%	1.77%
2021	4.46%	4.48%	4.59%	3.51%	4.14%	2.83%	4.42%	3.32%	4.45%	3.57%
2022	6.82%	6.80%	7.70%	5.97%	6.15%	5.76%	7.70%	6.16%	8.62%	7.63%
2023*	3.90%	3.91%	4.20%	4.83%	2.94%	3.94%	4.37%	4.66%	5.76%	6.08%
Average Annual Growth Rates										
2003-22 (20 years)	**2.23%**	**2.23%**	**2.43%**	**2.17%**	**1.83%**	**1.80%**	**2.60%**	**2.36%**	**2.66%**	**2.43%**
2008-22 (15 years)	**2.08%**	**2.08%**	**2.30%**	**2.23%**	**1.97%**	**1.89%**	**2.54%**	**2.43%**	**2.68%**	**2.61%**
2013-22 (10 years)	**2.36%**	**2.36%**	**2.43%**	**2.48%**	**1.94%**	**1.83%**	**2.90%**	**2.90%**	**3.00%**	**3.04%**
2018-22 (5 years)	**3.31%**	**3.31%**	**3.54%**	**3.09%**	**2.81%**	**2.46%**	**3.96%**	**3.46%**	**4.08%**	**3.75%**
2022-23	**5.36%**	**5.36%**	**5.95%**	**5.40%**	**4.54%**	**4.85%**	**6.03%**	**5.41%**	**7.19%**	**6.86%**
Standard Deviation of Growth Rates										
2003-22 (20 years)	**1.40%**	**1.40%**	**1.70%**	**1.02%**	**1.26%**	**1.06%**	**1.60%**	**1.16%**	**1.81%**	**1.65%**

**2023 inflation values compare the mean of index values from the first 11 months of 2023 to the first 11 months of 2022 for GDP-PI and GDP-IPD, and the 10 months of 2023 to the first 10 months of 2022 for CPI.*

[1]All data in table are not seasonally adjusted. All growth rates are calcualted logarithmically.

[2]West Region includes the Mountain and Pacific Divisions (Mountain Division includes Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, and Wyoming)

[3]https://www.bls.gov/sae/additional-resources/metropolitan-statistical-area-definitions.htm

[4]U.S. Bureau of Economic Analysis, Table 1.5.4 Price Indexes for Gross Domestic Product, Expanded Detail (Last Revised on: December 21, 2023)

[5]U.S. Bureau of Economic Analysis, Table 1.1.9. Implicit Price Deflators for Gross Domestic Product (Last Revised on: December 21, 2023)

[6]U.S. Bureau of Labor Statistics, Consumer Price Index for All Urban Consumers [CUUR0000SA0]

[7]U.S. Bureau of Labor Statistics, Consumer Price Index for All Urban Consumers: All Items Less Food and Energy in U.S. City Average [CUUR0000SA0L1E,CUUS0000SA0L1E]

[8]U.S. Bureau of Labor Statistics, All items less food, shelter, and energy in U.S. city average, all urban consumers [CUUR0000SA0L12E,CUUS0000SA0L12E]

[9]U.S. Bureau of Labor Statistics, All items less food, shelter, energy, and used cars and trucks in U.S. city average, all urban consumers [CUUR0000SA0L12E4,CUUS0000SA0L12E4]

[10]The BLS states that "The set of components and sub-aggregates published for regional and metropolitan indexes is more limited that at the U.S. city average level; these indexes are byproducts of the national CPI program. Each local index has a much smaller sample size than the national or regional indexes and is, therefore, subject to substantially more sampling and other measurement error. As a result, local-area indexes are more volatile than the national or regional indexes, and we urge users to consider adopting the national or regional CPIs for use in escalator clauses. Used with caution, local-area CPI data can illustrate and explain the impact of local economic conditions on consumers' experience with price change. If there is no CPI for the area you are in, we can provide some guidance on a recommended area to use instead, but users must make the final decision." (Source: https://www.bls.gov/cpi/questions-and-answers.htm)

- Over the twenty years ending in 2022, the 2.23% average annual growth of the GDP-PI and GDP-IPD was well below the 2.71% trend of the ECI for utility industry salaries and wages, the 3.19% trend in the ECI for utility industry total compensation and the 2.72% trend in the Power Planner topline M&S price index for electric utilities. It was much further below the contemporaneous growth trends of the electric utility construction cost indexes. GDP-PI and GDP-IPD inflation was especially far below inflation of most M&S price and construction cost indexes in 2021 and 2022. This is particularly notable insofar as rapid inflation could recur in the next three years. A major reason for the slower historical growth trend of the GDP-PI and GDP-IPD is that it reflects growth in the multifactor productivity of the U.S. economy and this tended to be brisk in the last twenty years.

- If a macroeconomic inflation measure such as the GDP-IPD provided the basis for the inflation factor used in the Company's cost projections, we could therefore reasonably argue the need for an inflation differential (*trend GDP-IPD – trend input prices*) in the calculation of inflation factors. PSE could, alternatively, not ask for an inflation differential but argue that there is material value to customers in using the GDP-IPD as the inflation measure.

Table 11 presents the latest forecast of future GDP-PI inflation from the CBO and the latest forecast of GDP-IPD inflation from Moody's. There are columns for forecasted inflation and inflation factors. Earlier last year the CBO forecasted that, over the three years from 2024 to 2026, the GDP-PI would average 2.21% annual growth. More recently, Moody's has forecasted the GDP-IPD to average 2.09% annual growth over the same three year period. It is reasonable to view this as a forecast of GDP-PI inflation as well.

Table 11

Construction of a Macroeconomic Inflation Factor

	GDP-PI[1]		GDP-IPD[2]	
Year	Annual Growth Rate	Inflation Factor	Annual Growth Rate	Inflation Factor
2023	3.67%	1.00000	3.62%	1.00000
2024	2.47%	1.02503	2.24%	1.02261
2025	2.11%	1.04684	2.07%	1.04396
2026	2.05%	1.06849	1.98%	1.06484
2027	1.99%	1.08993	1.87%	1.08499
2028	1.99%	1.11187	1.92%	1.10601

Average Annual Growth Rates		
2024-2026	2.21%	2.09%
2027-2028	1.99%	1.90%
2024-2028	2.12%	2.02%

[1]Source: Congressional Budget Office February 2023 Long-Term Forecast

[2]Source: Moody's Analytics Forecast (baseline October 2023)

All growth rates calculated logarithmically.

Moody's GDP-IPD forecast of inflation over the 2024-2026 period is compared to input price forecasts that we have discussed in this report in Table 12. Gas and electric results are consolidated. It can be seen that the GDP-IPD is forecasted to grow only a little faster than M&S prices but considerably slower than wage rates or utility asset prices.

Table 12

How the GDP-PI and Various O&M and Capex Price Index Forecasts Compare

	Weight	Average Annual Growth Rate 2024-2026
GDP-IPD		2.09%
O&M Prices		
Labor	28.9%	3.88%
Gas & Electric M&S (corrected)	71.1%	1.65%
Total O&M		2.29%
Utility Asset Prices		
Electric	77.9%	5.22%
Gas	7.7%	-0.10%
General	6.0%	1.00%
Intangible	8.4%	1.00%
Total		4.20%

Notes:

The GDP-PI forecast is the latest GDP-IPD forecast from Moody's.

The weights for calculation of the gas and electric O&M input price index are based on 2024-2028 forecasts provided by the Company.

The weights for asset price inflation are based on total 2024-2028 capex as provided by the Company.

Based on our research, the only area where GDP-PI or GDP-IPD makes much sense as the basis for inflation factors is as a proxy for M&S price inflation. Accurate measurement of M&S price inflation is complicated and the GDP-IPD is forecasted to have a similar growth rate to that of our corrected custom M&S price index in the next five years. PSE has decided to use the custom corrected M&S price index even though it is forecasted to grow a little more slowly than the GDP-PI or GDP-IPD in the next three years.

5. Conclusions

5.1 Conclusions

Here are some salient conclusions from our inflation research and report.

- Determination of revenue requirements for MYRP and forward test year rate proceedings should involve explicit input price inflation assumptions.
- Many U.S. gas and electric utilities were not compensated for the unexpectedly rapid input price inflation they experienced in the last few years.
- Forecasting input price inflation accurately is still difficult, and inflation assumptions on which revenue requirements are based may turn out to be materially higher or lower than actual inflation.
- Forecasts of input price inflation should therefore play a larger role in rate proceedings today than they have in many years. Regulators should welcome more substantiation for inflation assumptions in revenue requirement proposals.
- Index logic provides the means to use inflation indexes to determine revenue requirements in MYRP and forward test year rate proceedings. Costs can be stated in real terms and converted to nominal costs on the basis of explicit inflation assumptions.
- There are many precedents for escalating the costs used to set utility rates using inflation indexes. The use of inflation indexes is especially common in MYRPs since multiple years of inflation are at issue. There are also precedents in utility ratemaking for forecasting costs in real terms and then escalating them for inflation. For both of these approaches, rates and revenue have in some cases been adjusted later for new inflation information.
- PEG has conducted empirical research for PSE that lays the foundation for using inflation indexing to establish revenue requirements in 2025 and 2026, the two years of its proposed MYRP. We have also provided forecasts for the following two years.