

Exh. RF-1T  
Docket UE-230172  
Witness: Ryan Fuller

**BEFORE THE WASHINGTON  
UTILITIES AND TRANSPORTATION COMMISSION**

WASHINGTON UTILITIES AND  
TRANSPORTATION COMMISSION,

Complainant,

v.

PACIFICORP dba  
PACIFIC POWER & LIGHT COMPANY

Respondent.

Docket UE-230172  
*(Consolidated)*

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In the Matter of

ALLIANCE OF WESTERN ENERGY  
CONSUMERS'

Petition for Order Approving Deferral of  
Increased Fly Ash Revenues

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Docket UE-210852  
*(Consolidated)*

**PACIFICORP**

**REBUTTAL TESTIMONY OF RYAN FULLER**

**October 2023**

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**ATTACHED EXHIBITS**

- Exhibit No. RF-2—Example 2024 PTC Rate Calculations
- Exhibit No. RF-3—Quick Guide: Some Popular BEA Price Indexes
- Exhibit No. RF-4—Projections of the 2023 GDP Implicit Price Deflator
- Exhibit No. RF-5—Congressional Budget Office 2023 GDP Price Index Forecast
- Exhibit No. RF-6—WIEC Response to RMP Data Request 2.2
- Exhibit No. RF-7—WIEC Response to RMP Data Request 2.3
- Exhibit No. RF-8—Mullins Transcript from Oregon Docket No. UE 420

1                                   **I. INTRODUCTION AND QUALIFICATIONS**

2   **Q. Please state your name, business address, and present position with PacifiCorp**  
3   **dba Pacific Power & Light Company (PacifiCorp or the Company).**

4   A. My name is Ryan Fuller, and my business address is 825 NE Multnomah Street, Suite  
5   1900, Portland, Oregon 97232. My present position is Senior Tax Director.

6   **Q. Please describe your education and professional experience.**

7   A. I graduated from the University of Idaho in 1997 with a Bachelor of Science Degree  
8   in Accounting. I am a licensed CPA (Inactive Status). Before joining the PacifiCorp  
9   tax department in 2003, I worked in public accounting for six years, first with Talbot,  
10   Korvola and Warwick, LLP and then for PricewaterhouseCoopers LLP. From  
11   November 2016 through May 2018, I was employed as Tax Director for Avangrid  
12   Renewables, LLC, before rejoining PacifiCorp as Senior Tax Director in May 2018.  
13   As Senior Tax Director, I am responsible for management and oversight of the  
14   Company’s tax function.<sup>1</sup>

15   **Q. Have you testified in other regulatory proceedings?**

16   A. Yes. I have testified in regulatory proceedings in each of the Company’s six state  
17   jurisdictions on various tax-related matters.

18                                   **II. PURPOSE AND SUMMARY OF TESTIMONY**

19   **Q. What is the purpose of your rebuttal testimony?**

20   A. My rebuttal testimony responds to the proposal made by Alliance of Western Energy  
21   Consumers (AWEC) witness Bradley G. Mullins to use a 2024 Federal Production  
22   Tax Credit (PTC) Rate of 3.0 cents per kilowatt hour (kWh) for purposes of setting

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<sup>1</sup> Unless personal pronouns are specified by a witness in their testimony, in my rebuttal testimony I use “they/them” when using a pronoun to refer to a witness.

1 rates in this case. More specifically, in recommending the Washington Utilities and  
2 Transportation Commission (Commission) reject witness Mullins' proposal:

- 3 • I explain how witness Mullins' reliance on a dissimilar price index renders their  
4 conclusions invalid and provide objective evidence that supports a 2024 PTC rate  
5 of 2.9 cents per kWh as used by the Company in its filing.
- 6 • I bring to the attention of the Commission that witness Mullins' testimony is  
7 outdated due to the September 28, 2023, release of a comprehensive update to the  
8 National Economic Accounts (NEAs) by the Department of Commerce's Bureau  
9 of Economic Analysis (BEA).

10 I also provide testimony explaining there is no basis for AWEC's proposed  
11 adjustment for what they characterize as a PTC disallowance.

### 12 **III. AWEC'S PRODUCTION TAX CREDIT FORECAST**

13 **Q. Please explain the data needed to calculate the 2024 PTC Rate.**

14 A. Please refer to Exhibit No. RF-2. The formula for calculating the 2024 PTC Rate is  
15 provided in Section A and includes three inputs: (1) the 2023 Gross Domestic Product  
16 (GDP) Implicit Price Deflator, (2) the 1992 GDP Implicit Price Deflator, and (3) the  
17 Base PTC Rate. As illustrated in Section B of this exhibit, of these three inputs, only  
18 the 2023 GDP Implicit Price Deflator is unknown at this time, and it will not be  
19 known until it is published by the BEA in February 2024.

20 **Q. With respect to the 2024 PTC Rate, what facts should be agreed upon by  
21 PacifiCorp and AWEC?**

22 A. Both PacifiCorp and AWEC agree that the minimum 2024 Inflation Adjustment

1 Factor needed to produce a 2024 PTC Rate of 3.0 cents per kWh is 1.9667.<sup>2</sup> Filling in  
2 this blank allows for the derivation of the minimum 2023 GDP Implicit Price Deflator  
3 needed to produce a 2024 Inflation Adjustment Factor of 1.9667; the value derived is  
4 123.323 as illustrated in Exhibit No. RF-2, Section C. If the 2023 GDP Implicit Price  
5 Deflator is lower by just one-thousandth, as illustrated in Section D, it will produce a  
6 2024 Inflation Adjustment Factor of 1.9666 and a 2024 PTC Rate of 2.9 cents per  
7 kWh. In summary, both PacifiCorp and AWEC should agree to the following four  
8 facts:

- 9 1. The minimum 2024 Inflation Adjustment Factor needed to produce a 2024  
10 PTC Rate of 3.0 cents per kWh is 1.9667.
- 11 2. The minimum 2023 GDP Implicit Price Deflator needed to produce a  
12 2024 Inflation Adjustment Factor is 123.323.
- 13 3. The annual GDP Implicit Price Deflators for 1992 as published by the BEA in  
14 September 2023 is 62.707.
- 15 4. The annual GDP Implicit Price Deflator for 2022 as published by the BEA in  
16 September 2023 is 117.973.

17 **Q. What issue is before the Commission to decide the 2024 PTC Rate used for the**  
18 **Test Period?**

19 A. PacifiCorp used a projected 2024 PTC Rate of 2.9 cents per kWh for the purpose of  
20 the Test Period.<sup>3</sup> AWEC proposes using a projected 2024 PTC Rate of 3.0 cents per  
21 kWh.<sup>4</sup>

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<sup>2</sup> Mullins, Exh. BGM-1CT at 51:8-9.

<sup>3</sup> The Test Period is the 12-month period beginning January 1, 2024, through December 31, 2024.

<sup>4</sup> Mullins, Exh. BGM-1CT at 51:13-16.

1                   The 2024 PTC Rate is entirely dependent on the value of the 2023 GDP  
2                   Implicit Price Deflator that will be published by the BEA in February 2024. The issue  
3                   before the Commission is whether or not the price index will be less than 123.323, in  
4                   which case, the PTC rate will be 2.9 cents per kWh as projected by the Company.

5                   **Q. Please summarize the analysis performed by witness Mullins.**

6                   A. Albeit using incorrect values, in AWEC Exhibit No. BGM-9, witness Mullins simply  
7                   calculates the year-on-year change in value of the GDP Implicit Price Deflator needed  
8                   to achieve a 2024 PTC Rate of 3.0 cents per kWh and converts the change in value to  
9                   a percentage change in a manner consistent with following table (in which the correct  
10                  values are used):

<b>GDP Implicit Price Deflator</b>	
<b>Minimum 2023 value needed to achieve a 2024 PTC rate of 3.0 cents per kWh</b>	<b>123.323</b>
<b>2022 Annual GDP Implicit Price Deflator</b>	<b>117.973</b>
<b>Change in Value</b>	<b>5.350</b>
<b>Percentage Change In Value</b>	<b>4.535%</b>

11                  Witness Mullins then observes that “it can be determined that the PTC rate will  
12                  increase to 3.0 cents per kWh in 2024 so long as inflation equals or exceeds  
13                  [4.535%]<sup>5</sup> on an annualized basis for 2023, *as measured by the GDP implicit price*  
14                  *deflator.*”<sup>6</sup>

15                  **Q. Does witness Mullins provide evidence that inflation will equal or exceed 4.535**  
16                  **percent on an annualized basis for 2023, as measured by the GDP Implicit Price**  
17                  **Deflator?**

18                  A. No. To support the likelihood that inflation will exceed this target, witness Mullins

<sup>5</sup> For ease of reading this testimony, the correct percentage change in value as calculated in the table has been substituted for the erroneous percentage change in value of 3.63 percent as calculated by witness Mullins.

<sup>6</sup> Mullins, Exh. BGM-1CT at 51:20-52:2 (emphasis added).

1 does not cite forecast percentage rate changes for the price index by which the  
2 witness says inflation must be measured, the GDP Implicit Price Deflator.

3 Instead, witness Mullins cites a forecast annualized percentage change range  
4 for a price index that does not even closely mirror the GDP Implicit Price Deflator:  
5 The Core Personal Consumption Expenditures Price Index (Core PCE Price Index).<sup>7</sup>

6 The Core PCE Price Index measures prices for goods and services that are  
7 produced in or imported to the U.S. and bought by consumers; the index also  
8 excludes food and energy. In contrast, the GDP Implicit Price Deflator measures  
9 prices for goods and services that are produced in or exported from the U.S. and  
10 bought by consumers, business, and governments.

11 These significant differences, illustrated in Exhibit No. RF-3, make the  
12 conclusions drawn from the Core PCE Price Index by witness Mullins invalid,  
13 especially because objectively better information is readily available.

14 **Q. What objectively better information is available to make an informed decision**  
15 **on the value of the 2023 GDP Implicit Price Deflator?**

16 A. While the Company is not presently aware of a publicly available forecast of the GDP  
17 Implicit Price Deflator, there is another price index which closely mirrors the GDP  
18 Implicit Price Deflator for which a forecast is publicly available—the GDP Price  
19 Index.<sup>8</sup>

20 In Exhibit No. RF-4, Table 2, the Company provides a comparison of the  
21 historical price index values for the annual GDP Implicit Price Deflator and the

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<sup>7</sup> *Id.*, at 52:5-10.

<sup>8</sup> *See*, the BEA’s “Quick Guide: Some Popular BEA Price Indexes” provided as Exhibit No. RF-3. In this document the BEA makes this note about the GDP Implicit Price Deflator: “Closely mirrors the GDP Price index, although calculated differently.”

1 annual GDP Price Index for the years 1992 through 2022,<sup>9</sup> a period that covers the  
2 duration of the existence of the PTC. Exhibit No. RF-4, Table 1 summarizes the  
3 maximum variance between the two price indexes, both positive and negative, and the  
4 average variance over the subject time period. These two tables demonstrate and  
5 establish that the GDP Implicit Price Deflator closely mirrors the GDP Price Index as  
6 noted by the BEA.

7 The Congressional Budget Office’s July 2023 report, *An Update to the*  
8 *Economic Outlook: 2023 to 2025*, forecasts the 2023 GDP Price Index will increase  
9 by 3.755 percent over the 2022 GDP Price Index.<sup>10</sup> This forecast is well below the  
10 4.535 percent increase over the 2022 GDP Price Index, needed to achieve AWEC’s  
11 proposed 2024 PTC rate of 3.0 cents per kWh.

12 **Q. Are there any other reasons that invalidate the conclusions drawn by witness**  
13 **Mullins?**

14 A. Yes. For reasons not explained, witness Mullins uses fourth quarter values to  
15 calculate what they mischaracterize as “annualized inflation rates” in the GDP  
16 Implicit Price Deflator of 6.418 percent and 6.409 percent for 2021 and 2022,  
17 respectively.<sup>11</sup> Witness Mullins compares these percentages to 2021 and 2022 annual

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<sup>9</sup> The data for Fuller, Exh. RF-4, Table 2, is sourced from the *National Accounts (NIPA), 2023, Q2, Vintage: Third*, Bureau of Economic Analysis (Sep. 29, 2023) (available here: <https://apps.bea.gov/histdata/fileStructDisplay.cfm?HMI=7&DY=2023&DQ=Q2&DV=Third&dNRD=September-29-2023>). The historical GDP Price Index values are located in Section 1, Tab T10104-A, row 9. The historical GDP Implicit Price Deflator values are located in Section 1, Tab T10109-A, row 9.

<sup>10</sup> Fuller, Exh. RF-5 at Tab “2. Calendar Year”, Cell H58 (this exhibit was downloaded from the Congressional Budget Office, and is available here: <https://www.cbo.gov/data/budget-economic-data#11>). Under 10-Year Economic Projections, select the link for July 2023.

<sup>11</sup> Mullins, Exh. BGM-1CT at 52:3-5. Witness Mullins presented nearly identical testimony on behalf of Wyoming Industrial Energy Consumers (WIEC) in PacifiCorp’s pending Wyoming general rate case. *In re the Application of Rocky Mountain Power for Authority to Increase its Retail Electric Service Rates by Approximately \$140.2 Million per Year or 21.6 Percent and to Revise the Energy Cost Adjustment Mechanism*, Wyoming Public Service Commission Docket No. 20000-633-ER-23 (Record No. 17252), WIEC Exh. 202



1 inflation rates in the Core PCE Index to draw a “historical” comparison<sup>12</sup> that witness  
2 Mullins proposes can be used to project a “more likely than not” outcome for the  
3 2023 GDP Implicit Price Deflator.<sup>13</sup> This argument has two important flaws.

4 First, in a September 7, 2023, hearing before the Public Utility Commission of  
5 Oregon, which included cross-examination on an identical PTC adjustment,  
6 witness Mullins’ conceded that the GDP Implicit Price Deflator was “quite high”  
7 relative to the Core PCE Index in the two years of historical data the witness used,  
8 making their comparison of the historical relationship insufficient to forecast the  
9 same relationship in 2024.<sup>14</sup>

10 Second, a percentage change in values between sequential three-month  
11 periods (i.e., quarters) can be annualized, but a percentage change between values for  
12 two non-sequential three-month periods, as witness Mullins has calculated, cannot be  
13 annualized and has not been annualized. Setting aside an argument that an analysis of  
14 two years is insufficient to establish historic relationships between two price indexes,  
15 this is an oversight that further invalidates the only substantive argument put forth by  
16 witness Mullins.

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Corrected Direct Testimony and Exhibits of Brad Mullins at 82:8-10 (Aug. 14, 2023). Witness Mullins explains how these percentages were calculated in WIEC’s response to Rocky Mountain Power Data Request 2.2, provided as Exhibit No. RF-6. Because quarterly GDP Implicit Price Deflator values are never used to determine the annual Inflation Adjustment Factor, the annualized inflation rates calculated by witness Mullins are irrelevant as are all other percentages in Mullins, Exh. BGM-1CT at 52:2-11 that are subsequently derived from the invalid rates.

<sup>12</sup> Mullins, Exh. 52:5-8. Witness Mullins presented nearly identical testimony on behalf of WIEC in PacifiCorp’s pending Wyoming general rate case, Docket No. 20000-633-ER-23 (Record No. 17252), WIEC Exh. 202 Corrected Direct Testimony and Exhibits of Brad Mullins at 82:10-14 (Aug. 14, 2023). Witness Mullins explains how they draw a “historical” comparison between the Core PCE Index and the GDP Implicit Price Deflator in WIEC’s response to RMP Data Request 2.3, provided as Exhibit No. RF-7.

<sup>13</sup> Mullins, Exh. BGM-1CT at 51:7-8.

<sup>14</sup> Exhibit No. RF-8 at 15:22-24.

1 **Q. Have you identified any errors in AWEC Exhibit No. BGM-9?**

2 A. Yes. I have identified the following errors in AWEC Exhibit No. BGM-9, Tab

3 “Mullins Inflation Forecast.”

4 • Cell I36: The value is hard coded and is not the average of the four  
5 quarterly values in cells E36, F36, G36, and H36.

6 • Cells J36, J37 and J39: The annual value of 67.277 used by witness  
7 Mullins is in error. The correct 1992 GDP Implicit Price Deflator for  
8 2021 and 2022 was 67.282.

9 • Cell I39: An annual GDP Implicit Price Deflator of 132.219 will not  
10 produce the target Inflation Adjustment Factor of 1.9667 or greater  
11 when the correct 1992 GDP Implicit Price Deflator is used.

12 • Cell I40: The value in this cell erroneously uses quarterly values in  
13 column H, making the percentage irrelevant in terms of how it is used  
14 in witness Mullins’ testimony. The Inflation Adjustment Factor is  
15 based on annual values.

16 **Q. Can anything useful be derived from Exhibit No. BGM-9?**

17 A. Yes. While the calculation of the 2024 Inflation Adjustment Factor relies on annual  
18 values of the 2023 GDP Implicit Price Deflator that will not be published until  
19 February 2024, AWEC Exhibit No. BGM-9 demonstrates that an average of quarterly  
20 GDP Implicit Price Deflator estimates produces an accurate projection of the annual  
21 value. As of the drafting of this testimony, the BEA has published quarterly estimates  
22 for Q1 and Q2 of 2023.

23 At the bottom of AWEC Exhibit No. BGM-9, witness Mullins has included a  
24 section labeled “2024 Forecast.” In the following table, this section has been updated  
25 with the most recently published GDP Implicit Price Deflator estimates and expanded

1 to include annualized rates of inflation.<sup>15</sup>

Projection of Annualized Rate for Q3 and Q4 of 2023 to Achieve an Annual GDP IPD of 123.323						
Item	Published			Projection		
	Q4 2022	Q1 2023	Q2 2023	Q3 2023	Q4 2023	2023 Annual
GDP Implicit Price Deflator	120.093	121.261	121.766	123.997	126.269	123.323
% Change Quarter-to-Quarter	-----	0.973%	0.416%	1.832%	1.832%	-----
% Change at an Annual Rate	-----	3.947%	1.676%	7.533%	7.533%	-----

2 This analysis shows the annualized rate of inflation in the Q2 2023 GDP  
3 Implicit Price Deflator (1.676 percent) decreased by nearly 58 percent as compared to  
4 the annualized rate of inflation in the Q1 2023 GDP Implicit Price Deflator  
5 (3.947 percent). The analysis also shows to achieve an annual GDP Implicit Price  
6 Deflator of 123.323, inflation must occur at an annualized rate of 7.533 percent for  
7 each of the next two quarters assuming inflation is experienced ratably.

8 This analysis weighs heavily against the likelihood of the 2023 annual GDP  
9 Implicit Price Deflator reaching a value equal to or greater than 123.323. In the  
10 history of the PTC, the annualized rate for quarter-on-quarter changes in the GDP  
11 Implicit Price Deflator has only ever exceeded 7.533 percent twice; once in Q1 2022  
12 and again in Q2 2022.<sup>16</sup> Since that time, the annualized rate for quarter-on-quarter  
13 changes in the GDP Implicit Price Deflator has cooled off significantly and has come  
14 nowhere near approaching 7.533 percent, including in the first two quarters of 2023  
15 as illustrated in the following table.<sup>17</sup>

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<sup>15</sup> The published values of the Q4 2022, Q1 2023, and Q2 2023 GDP Implicit Price Deflators are sourced from the BEA for Year, Quarter: 2023, Q2, Vintage: Third., Section 1, Tab T10109-Q, cells KU9, KV9, and KW9, respectively (available here: <https://apps.bea.gov/histdata/histChildLevels.cfm?HMI=7>).

<sup>16</sup> For an history of the annualized rate for quarter-on-quarter change in the GDP Implicit Price Deflator see the BEA for Year, Quarter: 2023, Q2, Vintage: Third., Section 1, Tab T10107-Q, row 38 (available here: <https://apps.bea.gov/histdata/histChildLevels.cfm?HMI=7>).

<sup>17</sup> The table percentages are sourced from the BEA for Year, Quarter: 2023, Q2, Vintage: Third., Section 1, Tab T1017-Q, cells KQ38:KV38 (available here: <https://apps.bea.gov/histdata/histChildLevels.cfm?HMI=7>).

Quarterly GDP Implicit Price Deflator: Annualized Percent Change from Preceding Period					
Q1 2022	Q2 2022	Q3 2022	Q4 2022	Q1 2023	Q2 2023
8.4%	9.1%	4.5%	3.9%	3.9%	1.7%

1           Witness Mullins has submitted no explanation or evidence as to why inflation  
2           in the GDP Implicit Price Deflator would suddenly jump to record-level annualized  
3           rates after cooling off so significantly in Q2 2023. Indeed, in the same Oregon  
4           proceeding referenced above, witness Mullins conceded that “inflation has softened  
5           some” over the course of 2023 and that the increase to the PTC they recommend is  
6           “not a slam dunk” and “could go either way.”<sup>18</sup>

7           **Q. Has the PTC rate been contested between witness Mullins and PacifiCorp in past**  
8           **proceedings?**

9           A. Yes. In the Company’s most recently decided Wyoming general rate case, Docket  
10           No. 20000-578-ER-20, witness Mullins argued against the Company’s projected  
11           2021 PTC rate of 2.5 cents per kWh, in favor of 2.6 cents per kWh.<sup>19</sup> The actual PTC  
12           rate for 2021 is 2.5 cents per kWh as projected by the Company.<sup>20</sup>

13           **Q. Based on this information, what 2024 PTC Rate should be used for the Test**  
14           **Period?**

15           A. The Congressional Budget Office’s 2023 forecast of inflation in the GDP Price Index,  
16           the application of which results in a 2024 PTC Rate of 2.9 cents per kWh, is

<sup>18</sup> Fuller, Exh. RF-8 at 8:19-9:4.

<sup>19</sup> *In re the Application of Rocky Mountain Power for Authority to Increase its Retail Electric Service Rates by Approximately \$7.1 Million Per Year or 1.1 Percent, to Revise the Energy Cost Adjustment Mechanism, and to Discontinue Operations at Cholla Unit 4*, Docket No. 20000-578-ER-20 (Record No. 15464), Mullins, Exh. No. 302 at 55:11-58:8; RMP Exh. 28b, Rebuttal Testimony of Nicholas L. Highsmith at 29:15-31:8; WIEC Exh. 310, Response to Rocky Mountain Power Rebuttal Testimony and Exhibits of Bradley G. Mullins at 29:8-32:12; Sur-Reply Testimony of Nicholas L. Highsmith at 13:6-16:15.

<sup>20</sup> Credit for Renewable Electricity Production, Refined Coal Production, and Indian Coal Production, and Publication of Adjustment Factors and Reference Prices for Calendar Year 2021, Notice 2021-32, 2021-21 IRB 1159.

1 independent and objective data to which weight can be given and is of far better  
2 quality than the data cited by AWEC. Furthermore, AWEC has submitted nothing in  
3 the record to explain or support why inflation in the GDP Implicit Price deflator  
4 would jump drastically, as is needed to result in a PTC Rate of 3.0 cents per kWh, for  
5 the remaining two quarters of 2023 after cooling off so significantly in the second  
6 quarter. For these reasons, the best estimate of the 2024 PTC Rate is 2.9 cents per  
7 kWh as projected by the Company.

8 **Q. In the event the Commission decides to use a 2024 PTC rate of 3.0 cents per**  
9 **kWh, is the adjustment calculated by witness Mullins correct?**

10 A. No. Witness Mullins erroneously uses a PTC rate of 3.3 cents per kilowatt hour for  
11 the 2024 wind projects. Facilities placed in service after December 31, 2021, and  
12 before January 1, 2025, are subject to a calculation of the PTC rate under Internal  
13 Revenue Code Section 45 as amended by the Inflation Reduction Act of 2022.<sup>21</sup> This  
14 calculation is slightly different than the calculation of the PTC rate used for facilities  
15 placed in service prior to January 1, 2022, and is not the subject of witness Mullins  
16 testimony. The Company's projected 2024 PTC rate of 3.0 cents per kilowatt hour for  
17 the facilities placed in service in 2024 has not been disputed by AWEC.

#### 18 **IV. COMPREHENSIVE UPDATE TO THE NATIONAL ACCOUNTS**

19 **Q. Is witness Mullins' testimony regarding the Production Tax Credit Rate**  
20 **Forecast outdated because the BEA subsequently released a comprehensive**  
21 **update to the National Economic Accounts?**

22 A. Yes. Comprehensive updates are usually conducted at five-year intervals and provide

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<sup>21</sup> 26 U.S.C. § 45(a); Inflation Reduction Act of 2022, Pub. L. No. 117-169, § 13101(k)(1), 136 Stat. 1818, 1913 (“[T]he amendments made by this section shall apply to facilities placed in service after December 31, 2021.”).

1 an opportunity to improve the NEAs through (1) statistical changes to introduce new  
 2 and improved methodologies and to incorporate newly available and revised source  
 3 data; (2) changes in definitions and classifications to more accurately portray the  
 4 evolving U.S. economy and to provide consistent comparisons with data for other  
 5 national economies; and (3) changes in presentations to reflect the definitional and  
 6 statistical changes, where necessary, or to provide additional data or perspectives for  
 7 users. These improvements ensure the accounts continue to accurately measure the  
 8 structure of the U.S. economy.

9 With respect to the September 2023 comprehensive update, the output and  
 10 price measures will use 2017 as the reference year; previously the reference year is  
 11 2012. Accordingly, quantity and price indexes, including the GDP Implicit Price  
 12 Deflator, will be expressed as 2017 equal to 100. Because the GDP Implicit Price  
 13 Deflator is a chained price index, all pre- and post-2017 values are updated as well.

14 The following table illustrates the magnitude of the impact the comprehensive  
 15 update had on GDP Implicit Price Deflator values used by witness Mullins.

Change in GDP Implicit Price Deflators after September 2023 Comprehensive Update						
National Income and Product Accounts Release				GDP Implicit Price Deflator		
Year	Quarter	Vintage	Release Date	Q1 2023	Q2 2023	1992
2023	Q2	Second	08/31/23	130.800	131.453	67.282
2023	Q2	Third	09/28/23	121.261	121.766	62.707

16 The comprehensive update was released September 28, 2023; after witness  
 17 Mullins submitted their response testimony and before I submitted rebuttal testimony.  
 18 As a result, my testimony incorporates the comprehensive update while witness  
 19 Mullins' testimony does not. The changes in GDP Implicit Price Deflator values are  
 20 significant enough that they certainly affect the analytics performed, but also  
 21 potentially the conclusions reached, by witness Mullins.

1           **V.    AWEC’S PRODUCTION TAX CREDIT DISALLOWANCE**

2   **Q.    Witness Mullins testifies that PacifiCorp’s PTC workpaper contains a note**  
3           **“stating that a portion of the PTCs associated with the Glenrock and Rolling**  
4           **Hills facilities had been disallowed.”<sup>22</sup> Is this true?**

5   **A.    No. Witness Mullins testimony is misleading. The workpaper footnote referenced by**  
6           **witness Mullins begins “Total available kWh is reflected net of the generation that is**  
7           **not considered PTC eligible because the facility was not fully repowered.”<sup>23</sup>**

8                   Some of the wind turbines (*i.e.*, facilities) were not repowered at Glenrock I,  
9           Glenrock III, and Rolling Hills. The facilities that were not repowered were placed in  
10          service in 2008 and 2009. Accordingly, the 10-year production tax credit period for  
11          those facilities has expired and, by law, the kWh produced by those facilities are no  
12          longer PTC eligible. It is my understanding that Company’s repowering financial  
13          analysis properly excluded PTCs on these facilities. There simply is no basis for  
14          witness Mullins’ proposed adjustment.

15                   The footnote goes on to explain the percentage production at each project that  
16          is attributable to facilities that have not been repowered.<sup>24</sup> The percentage is used to  
17          adjust total production to PTC eligible production. Although the word “disallowed” is  
18          used to describe the production from these projects that is not PTC eligible under the  
19          law, nowhere does the workpaper say that PTCs have been disallowed.

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<sup>22</sup> Mullins, Exh. BGM-1CT at 54:4-6.

<sup>23</sup> Cheung, Exh. “230172-PAC-SLC-7-3ProductionTaxCreditYear1.xlsx” at tab “7.3.1.”

<sup>24</sup> *Id.*

1

**VI. CONCLUSION**

2 **Q. Does this conclude your rebuttal testimony?**

3 **A. Yes.**



Exh. RF-2  
Docket UE-230172  
Witness: Ryan Fuller

**BEFORE THE WASHINGTON  
UTILITIES AND TRANSPORTATION COMMISSION**

WASHINGTON UTILITIES AND  
TRANSPORTATION COMMISSION,

Complainant,

v.

PACIFICORP dba  
PACIFIC POWER & LIGHT COMPANY

Respondent.

Docket UE-230172  
*(Consolidated)*

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In the Matter of

ALLIANCE OF WESTERN ENERGY  
CONSUMERS'

Petition for Order Approving Deferral of  
Increased Fly Ash Revenues

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Docket UE-210852  
*(Consolidated)*

**PACIFICORP**

**EXHIBIT OF RYAN FULLER**

**Example 2024 PTC Rate Calculations**

**October 2023**

<b>A</b>	$\frac{\text{2023 GDP Implicit Price Deflator}}{\text{1992 GDP Implicit Price Deflator}} =$	2024 Inflation Adjustment Factor	X	Base PTC Rate	=	2024 PTC Rate
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<b>B</b>	$\frac{X}{62.707} =$	?	X	0.015	=	?
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<b>C</b>	$\frac{123.323}{62.707} =$	1.9667	X	0.015	=	0.030
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<b>D</b>	$\frac{123.322}{62.707} =$	1.9666	X	0.015	=	0.029
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**Note 1:** The Department of Commerce Bureau of Economic Analysis publishes the GDP Implicit Price Deflator to the thousandth. The Internal Revenue Service publishes the Inflation Adjustment Factor to the ten-thousandth. Internal Revenue Code (IRC) Section 45 requires the PTC rate to be rounded to the nearest 0.1 cent.

**Note 2:** IRC Section 45 requires the revision of the GDP Implicit Price Deflator used for the purposes of calculating the Inflation Adjustment Factor is the most recent revision of GDP Implicit Price Deflator for the preceding calendar year published by the Department of Commerce before March 15 of the calendar year for which the PTC rate is being determined.

Exh. RF-3  
Docket UE-230172  
Witness: Ryan Fuller

**BEFORE THE WASHINGTON  
UTILITIES AND TRANSPORTATION COMMISSION**

WASHINGTON UTILITIES AND  
TRANSPORTATION COMMISSION,

Complainant,

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Docket UE-230172  
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Docket UE-210852  
*(Consolidated)*

**PACIFICORP**

**EXHIBIT OF RYAN FULLER**

**Exam Quick Guide: Some Popular BEA Price Indexes**

**October 2023**

# Quick Guide: Some Popular BEA Price Indexes



Measures prices for final goods and services that are:

Bought by consumers	Bought by businesses & governments	Produced in U.S.	Imported to U.S.	Exported from U.S.
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**PCE Price Index**  
Personal Consumption Expenditures Price Index



- Closely watched by the Federal Reserve
- Similar to the BLS Consumer Price Index; the formulas and uses differ
- Captures consumers' changing behavior and a wide range of expenses

**Core PCE Price Index**  
PCE Price Index, Excluding Food and Energy



- Closely watched by the Federal Reserve
- Excludes two categories prone to volatile prices that may distort overall trends

**Gross Domestic Purchases Price Index**



- BEA's featured measure of inflation in the U.S. economy overall

**GDP Price Index**  
Gross Domestic Product Price Index



- Measures only U.S.-produced goods and services

**GDP Price Deflator**  
Gross Domestic Product Implicit Price Deflator



- Closely mirrors the GDP price index, although calculated differently
- Used by some firms to adjust payments in contracts

Exh. RF-4  
Docket UE-230172  
Witness: Ryan Fuller

**BEFORE THE WASHINGTON  
UTILITIES AND TRANSPORTATION COMMISSION**

WASHINGTON UTILITIES AND  
TRANSPORTATION COMMISSION,

Complainant,

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PACIFICORP dba  
PACIFIC POWER & LIGHT COMPANY

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Docket UE-230172  
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In the Matter of

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Docket UE-210852  
*(Consolidated)*

**PACIFICORP**

**EXHIBIT OF RYAN FULLER**

**Projections of the 2023 GDP Implicit Price Deflator**

**October 2023**

**TABLE I: Variance Summary**

Maximum Negative Variance	(0.026)
Maximum Positive Variance	0.039
Average Variance	0.005

**TABLE 2: Historical Price Index Values (2017 =100)**

<b>Year</b>	<b>GDP Implicit Price Deflator</b>	<b>GDP Price Index</b>	<b>Variance (1)</b>
1992	62.707	62.701	0.006
1993	64.194	64.189	0.005
1994	65.564	65.557	0.007
1995	66.939	66.933	0.006
1996	68.164	68.156	0.008
1997	69.340	69.337	0.003
1998	70.119	70.102	0.017
1999	71.111	71.084	0.027
2000	72.722	72.709	0.013
2001	74.360	74.385	(0.025)
2002	75.515	75.500	0.015
2003	77.006	77.012	(0.006)
2004	79.077	79.069	0.008
2005	81.556	81.537	0.019
2006	84.071	84.074	(0.003)
2007	86.349	86.352	(0.003)
2008	88.013	87.977	0.036
2009	88.556	88.557	(0.001)
2010	89.632	89.618	0.014
2011	91.481	91.466	0.015
2012	93.185	93.176	0.009
2013	94.771	94.786	(0.015)
2014	96.421	96.436	(0.015)
2015	97.316	97.277	0.039
2016	98.241	98.208	0.033
2017	100.000	100.000	0.000
2018	102.291	102.290	0.001
2019	104.008	104.008	0.000
2020	105.381	105.407	(0.026)
2021	110.213	110.220	(0.007)
2022	117.973	117.996	(0.023)

(1) Positive variances reflect years for which the GDP Implicit Price Deflator is greater than the GDP Price Index. Negative variances reflect years for which the GDP Implicit Price Deflator is less than the GDP Price Index.

Exh. RF-5  
Docket UE-230172  
Witness: Ryan Fuller

**BEFORE THE WASHINGTON  
UTILITIES AND TRANSPORTATION COMMISSION**

WASHINGTON UTILITIES AND  
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In the Matter of

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Docket UE-210852  
*(Consolidated)*

**PACIFICORP**

**EXHIBIT OF RYAN FULLER**

**Congressional Budget Office 2023 GDP Price Index Forecast**

**October 2023**

This file presents data that supplement CBO's July 2023 report *An Update to the Economic Outlook: 2023 to 20*  
[www.cbo.gov/publication/59258](http://www.cbo.gov/publication/59258)

## **Contents**

1. July 2023 Baseline Forecast—Data Release (Quarterly)
2. July 2023 Baseline Forecast—Data Release (Calendar Year)
3. July 2023 Baseline Forecast—Data Release (Fiscal Year)



July 2023 Baseline Forecast—Data Release (Quarterly)

Units		2020Q1	2020Q2	2020Q3	2020Q4	2021Q1	2021Q2	2021Q3	2021Q4	2022Q1	2022Q2	2022Q3	2022Q4	2023Q1	2023Q2	2023Q3	2023Q4	2024Q1	2024Q2	2024Q3	2024Q4	2025Q1	2025Q2	2025Q3	2025Q4
<b>Output</b>																									
Gross Domestic Product (GDP)	Billions of dollars	21538	19637	21362	21705	22314	23047	23550	24349	24741	25249	25724	26138	26486	26723	26934	27139	27373	27624	27892	28198	28520	28840	29158	29474
	Percentage change, annual rate	-3.1	-30.9	40.1	6.6	11.7	13.8	9.0	14.3	6.6	8.5	7.7	6.6	5.4	3.6	3.2	3.1	3.5	3.7	3.9	4.5	4.6	4.6	4.5	4.4
Gross National Product (GNP)	Billions of dollars	21794	19806	21562	21867	22511	23193	23718	24531	24929	25456	25885	26290	26593	26838	27044	27239	27464	27704	27965	28265	28584	28904	29225	29546
	Percentage change, annual rate	-3.0	-31.8	40.5	5.8	12.3	12.7	9.4	14.4	6.7	8.7	6.9	6.4	4.7	3.7	3.1	2.9	3.3	3.6	3.8	4.4	4.6	4.5	4.5	4.5
Real GDP	Billions of chained (2012) dollars	18990	17379	18744	18924	19216	19544	19673	20006	19924	19895	20055	20183	20246	20318	20348	20361	20409	20479	20559	20669	20794	20918	21040	21159
	Percentage change, annual rate	-4.6	-29.9	35.3	3.9	6.3	7.0	2.7	7.0	-1.6	-0.6	3.2	2.6	1.3	1.4	0.6	0.3	0.9	1.4	1.6	2.2	2.4	2.4	2.4	2.3
Real GNP	Billions of chained (2012) dollars	19219	17531	18922	19069	19390	19672	19817	20159	20080	20064	20185	20304	20332	20410	20435	20441	20481	20543	20617	20723	20846	20969	21093	21215
	Percentage change, annual rate	-4.6	-30.8	35.7	3.1	6.9	5.9	3.0	7.1	-1.6	-0.3	2.4	2.4	1.6	1.5	0.5	0.1	0.8	1.2	1.5	2.1	2.4	2.4	2.4	2.3
Real Gross Value Added: Nonfarm Business	Billions of chained (2012) dollars	14494	13014	14334	14521	14819	15138	15240	15576	15479	15431	15569	15684	15699	15757	15778	15817	15879	15952	16055	16174	16292	16408	16520	16620
	Percentage change, annual rate	-6.7	-35.0	47.2	5.3	8.5	8.9	2.7	9.1	-2.5	-1.2	3.6	2.9	0.5	1.5	0.5	0.0	1.0	1.6	1.8	2.6	3.0	2.9	2.9	2.8
<b>Potential GDP and Its Components</b>																									
Potential GDP	Billions of dollars	21931	21942	22213	22449	22831	23298	23771	24290	24907	25577	25969	26335	26714	26979	27273	27582	27875	28154	28438	28720	28999	29278	29558	29843
	Percentage change, annual rate	3.5	0.2	5.0	4.3	7.0	8.4	8.4	9.0	10.5	11.2	6.3	5.8	5.9	4.0	4.4	4.6	4.3	4.1	4.1	4.0	3.9	3.9	3.9	3.9
Real Potential GDP	Billions of chained (2012) dollars	19337	19419	19490	19573	19662	19757	19857	19958	20058	20154	20246	20334	20421	20512	20604	20693	20783	20872	20962	21052	21144	21236	21329	21423
	Percentage change, annual rate	1.9	1.7	1.5	1.7	1.8	2.0	2.0	2.1	2.0	1.9	1.8	1.8	1.7	1.8	1.8	1.8	1.7	1.7	1.7	1.7	1.7	1.8	1.8	1.8
Potential Labor Force	Millions	164	164	164	165	165	165	165	165	166	166	166	166	166	166	166	166	166	166	166	166	167	167	168	168
	Percentage change, annual rate	0.2	0.2	0.2	0.2	0.3	0.5	0.6	0.6	0.5	0.4	0.2	0.2	0.1	0.3	0.3	0.3	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.5
Potential Labor Force Productivity	Ratio of potential GDP to potential labor force	117.7	118.1	118.5	118.9	119.4	119.8	120.2	120.7	121.1	121.6	122.1	122.6	123.0	123.5	124.0	124.4	124.8	125.3	125.7	126.1	126.4	126.8	127.2	127.6
	Percentage change, annual rate	1.6	1.5	1.3	1.5	1.5	1.5	1.5	1.5	1.5	1.6	1.6	1.6	1.6	1.5	1.5	1.4	1.4	1.3	1.3	1.3	1.2	1.3	1.3	1.3
Potential Labor Force Participation Rate	Percent	63.3	63.3	63.2	63.2	63.1	63.1	63.0	62.9	62.8	62.8	62.8	62.7	62.6	62.6	62.5	62.4	62.4	62.3	62.3	62.2	62.2	62.1	62.1	62.1
Noncyclical Rate of Unemployment	Percent	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4
Output Gap	Percentage of Potential GDP	-1.8	-10.5	-3.8	-3.3	-2.3	-1.1	-0.9	0.2	-0.7	-1.3	-0.9	-0.7	-0.9	-0.9	-1.2	-1.6	-1.8	-1.9	-1.9	-1.8	-1.7	-1.5	-1.4	-1.2
<b>Potential GDP and Its Components (Nonfarm Business Sector)</b>																									
Real Potential GDP	Billions of chained (2012) dollars	14902	14978	15043	15118	15197	15282	15371	15461	15549	15636	15719	15801	15881	15966	16047	16129	16209	16290	16372	16454	16537	16620	16705	16791
	Percentage change, annual rate	2.3	2.0	1.8	2.0	2.1	2.2	2.3	2.4	2.3	2.2	2.2	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1
Potential Hours Worked	2012=100	113.9	114.0	114.1	114.3	114.4	114.6	114.8	115.0	115.2	115.3	115.4	115.5	115.5	115.6	115.7	115.9	116.0	116.1	116.2	116.4	116.5	116.7	116.8	116.9
	Percentage change, annual rate	0.5	0.5	0.4	0.4	0.5	0.6	0.7	0.7	0.6	0.5	0.3	0.2	0.2	0.3	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.5
Capital Services Index	2012=100	121.7	122.1	122.7	123.4	124.0	124.7	125.4	126.2	126.9	127.7	128.5	129.3	130.0	130.7	131.4	132.0	132.6	133.2	133.8	134.4	135.0	135.6	136.3	137.0
	Percentage change, annual rate	2.1	1.3	2.0	2.1	2.2	2.3	2.3	2.4	2.4	2.4	2.5	2.4	2.2	2.2	2.0	1.9	1.8	1.8	1.8	1.8	1.9	2.0	2.0	2.0
Potential Total Factor Productivity	2012=100	106.5	106.8	107.1	107.3	107.6	107.9	108.2	108.5	108.8	109.1	109.4	109.7	110.0	110.3	110.6	110.9	111.2	111.5	111.9	112.2	112.5	112.8	113.1	113.4
	Percentage change, annual rate	1.0	1.0	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Potential Labor Productivity	Ratio of potential GDP to potential hours worked in the NFB sector	68.3	68.5	68.8	69.0	69.3	69.6	69.9	70.1	70.4	70.7	71.1	71.4	71.7	72.0	72.3	72.6	72.9	73.2	73.5	73.8	74.0	74.3	74.6	74.9
	Percentage change, annual rate	1.7	1.6	1.3	1.6	1.6	1.6	1.6	1.6	1.7	1.8	1.8	1.8	1.8	1.8	1.7	1.6	1.6	1.5	1.5	1.5	1.5	1.6	1.6	1.6
Capital Share of Income	Ratio	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
<b>Prices</b>																									
Price Index, Personal Consumption Expenditures (PCE)	2012=100	110.9	110.4	111.4	111.8	113.1	114.8	116.4	118.2	120.3	122.5	123.8	124.9	126.2	127.1	128.1	129.0	129.9	130.7	131.5	132.3	133.1	133.8	134.6	135.3
	Percentage change, annual rate	1.5	-1.8	3.4	1.6	4.5	6.4	5.6	6.2	7.5	7.3	4.3	3.7	4.2	3.0	3.0	3.1	2.8	2.5	2.5	2.4	2.3	2.3	2.2	2.2
Price Index, PCE, Excluding food and energy	2012=100	113.1	112.8	113.7	114.2	115.1	116.8	118.2	119.6	121.2	122.6	124.0	125.3	126.9	128.2	129.4	130.4	131.4	132.4	133.3	134.1	135.0	135.8	136.6	137.4
	Percentage change, annual rate	1.9	-1.0	3.2	1.5	3.2	6.0	4.8	4.8	5.6	4.7	4.7	4.4	5.0	4.3	3.7	3.4	3.1	2.9	2.7	2.6	2.5	2.5	2.4	2.4
Consumer Price Index, All Urban Consumers (CPI-U)	1982-84=100	258.8	256.3	259.2	261.0	263.7	268.6	272.9	278.7	284.9	291.5	295.5	298.5	301.3	303.4	305.9	308.4	310.7	312.7	314.7	316.6	318.4	320.1	321.8	323.5
	Percentage change, annual rate	1.4	-3.8	4.6	2.8	4.2	7.5	6.6	8.8	9.2	9.7	5.5	4.2	3.8	2.8	3.2	3.3	3.0	2.5	2.6	2.5	2.3	2.2	2.1	2.1
CPI-U, Excluding Food and Energy	1982-84=100	267.0	265.8	268.3	269.8	270.9	275.6	279.1	283.4	288.0	292.2	296.6	300.4	304.0	307.6	310.8	313.7	316.4	318.8	321.0	323.1	325.1	327.0	328.9	330.7
	Percentage change, annual rate	2.4	-1.8	3.8	2.3	1.6	7.2	5.1	6.2	6.7	6.0	6.2	5.1	5.0	4.8	4.3	3.8	3.4	3.1	2.8	2.6	2.5	2.4	2.3	2.3
Chained CPI-U	Dec 1999=100	145.0	144.3	146.1	146.3	147.9	151.1	153.4	155.4	158.9	163.7	166.0	166.9	168.7	170.6	171.6	172.0	173.3	175.2	175.9	176.0	177.0	178.8	179.4	179.3
	Percentage change, annual rate	1.4	-1.7	5.1	0.5	4.3	8.8	6.2	5.5	4.3	4.0	4.7	2.3	1.0	3.0	4.4	1.7	0.2	3.0	4.4	1.7	0.2	2.3	1.2	-0.1
GDP Price Index	2012=100	113.4	113.1	114.0	114.7	116.2	118.0	119.8	121.8	124.2	126.9	128.3	129.5	130.8	131.5	132.4	133.3	134.1	134.9	135.7	136.4	137.1	137.9	138.6	139.3
	Percentage change, annual rate	1.8	-1.3	3.5	2.5	5.2	6.3	6.2	6.8	8.3	9.0	4.4	3.9	4.2	2.1	2.6	2.8	2.5	2.3	2.3	2.3	2.1	2.1	2.1	2.1
Employment Cost Index (ECI), Private Wages and Salaries	December 2005=100	140.3	140.8	141.6	142.8	144.5	145.7	148.0	149.9	151.8	154.0	155.8	157.6	159.5	161.5	163.4	165.3	167.1	168.8	170.5	172.1	173.6	175.2	176.7	178.3
	Percentage change, annual rate	4.1	1.4	2.3	3.4	4.8	3.4	6.5	5.2	5.9	4.8	4.7	4.9	5.0	4.9	4.8	4.4	4.1	4.0	3.8	3.7	3.6	3.5	3.5	3.5
Refiners' Acquisition Cost of Crude Oil, Imported	Dollars per barrel	43.3	25.2	39.9	40.8	55.1	64.5	68.3	73.6	89.7	107.8	91.7	78.2	69.4	69.4	71.0	68.1	67.8	67.0	66.5	66.1	65.7	65.4	65.1	64.8
Price of Crude Oil, West Texas Intermediate (WTI)	Dollars per barrel	45.8	27.8	40.9	42.5	57.8	66.1	70.6	77.5	94.5	108.7	93.2	82.8	76.1	76.1	74.4	71.4	71.1	70.3	69.7	69.2	68.7	68.3	67.9	67.5
Price of Natural Gas, Henry Hub	Dollars per MMBtu	1.9	1.7	2.0	2.5	3.6	2.9	4.4	4.8	4.7	7.5														

Nonwage Income	Billions of dollars	5510	5270	5518	5536	5506	5687	5738	5788	5826	5934	6017	6119	6190	6550	6657	6758	6821	6862	6905	6945	6983	7033	7099	7183
	Percentage of GDP	25.6	26.8	25.8	25.5	24.7	24.7	24.4	23.8	23.5	23.5	23.4	23.4	23.4	24.5	24.7	24.9	24.9	24.8	24.8	24.6	24.5	24.4	24.3	24.4
Proprietors' income, farm, with IVA & CCAdj	Billions of dollars	38	25	43	75	26	71	64	44	74	96	104	96	100	95	91	87	84	81	78	76	74	73	71	
	Percentage of GDP	0.2	0.1	0.2	0.3	0.1	0.3	0.3	0.2	0.3	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	
Proprietors' income, nonfarm, with IVA & CCAdj	Billions of dollars	1605	1450	1709	1627	1629	1706	1729	1746	1737	1740	1768	1782	1797	1801	1828	1849	1868	1887	1906	1927	1951	1977	2002	2028
	Percentage of GDP	7.5	7.4	8.0	7.5	7.3	7.4	7.3	7.2	7.0	6.9	6.9	6.8	6.8	6.7	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.9	6.9	
Income, rental, with CCAdj	Billions of dollars	723	718	723	716	719	714	723	740	745	776	795	812	842	864	878	877	878	878	877	878	877	878	874	879
	Percentage of GDP	3.4	3.7	3.4	3.3	3.2	3.1	3.1	3.0	3.0	3.1	3.1	3.1	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.1	3.1	3.0	3.0	
Interest income, personal	Billions of dollars	1660	1639	1643	1647	1656	1665	1656	1658	1671	1709	1738	1789	1809	2195	2274	2320	2340	2340	2383	2397	2407	2432	2471	
	Percentage of GDP	7.7	8.3	7.7	7.6	7.4	7.2	7.0	6.8	6.8	6.8	6.8	6.8	6.8	8.0	8.1	8.4	8.5	8.5	8.5	8.4	8.4	8.3	8.3	
Dividend income, personal	Billions of dollars	1484	1438	1401	1470	1476	1531	1567	1601	1599	1614	1621	1635	1648	1657	1665	1666	1669	1672	1676	1680	1680	1703	1718	1734
	Percentage of GDP	6.9	7.3	6.6	6.8	6.6	6.6	6.7	6.6	6.5	6.4	6.3	6.3	6.2	6.2	6.2	6.1	6.1	6.1	6.0	6.0	5.9	5.9	5.9	
Profits, Corporate, With IVA & CCAdj	Billions of dollars	2230	2002	2466	2343	2588	2787	2844	2866	2870	3001	3000	2948	2788	2630	2601	2557	2576	2603	2634	2708	2802	2883	2950	3006
	Percentage of GDP	10.4	10.2	11.5	10.8	11.6	12.1	12.1	11.8	11.6	11.9	11.7	11.2	10.5	9.8	9.7	9.4	9.4	9.4	9.6	9.8	10.0	10.1	10.2	
Profits, Corporate, Domestic, With IVA & CCAdj	Billions of dollars	1736	1597	2041	1947	2153	2407	2432	2443	2433	2539	2553	2471	2141	2090	2099	2116	2137	2201	2285	2355	2412	2456		
	Percentage of GDP	8.1	8.1	9.6	9.0	9.6	10.4	10.3	10.0	9.8	10.1	9.9	9.5	8.8	8.1	7.9	7.7	7.7	7.7	7.7	7.8	8.0	8.2	8.3	
<b>Components of GDP (Nominal)</b>																									
Personal Consumption Expenditures	Billions of dollars	14440	13050	14389	14586	15132	15814	16147	16518	16875	17261	17543	17750	18099	18288	18450	18584	18732	18878	19058	19266	19477	19681	19889	20093
	Percentage change, annual rate	-4.8	-33.3	47.8	5.6	15.8	19.3	8.7	9.5	8.9	9.5	6.7	4.8	8.1	4.3	3.6	2.9	3.2	3.1	3.9	4.4	4.5	4.2	4.3	
Gross Private Domestic Investment	Billions of dollars	3738	3161	3743	3929	3902	3943	4109	4499	4671	4610	4579	4670	4577	4654	4668	4670	4685	4730	4780	4846	4921	5007	5088	5168
	Percentage change, annual rate	-4.4	-48.8	96.6	21.4	-2.7	4.3	17.9	43.7	16.2	-5.1	-2.7	8.2	-7.7	6.9	1.2	0.2	1.2	4.0	4.2	5.7	6.3	7.2	6.6	
Nonresidential fixed investment	Billions of dollars	2884	2657	2782	2868	2935	3007	3046	3112	3225	3292	3403	3468	3538	3589	3605	3611	3625	3652	3687	3723	3759	3801	3845	3890
	Percentage change, annual rate	-7.0	-28.0	20.2	13.0	9.6	10.3	5.3	8.9	15.4	8.6	14.2	7.7	8.3	6.0	1.8	0.7	1.5	3.0	3.9	4.0	3.8	4.6	4.7	
Residential fixed investment	Billions of dollars	867	802	925	1010	1070	1096	1118	1147	1189	1172	1105	1041	1023	1024	1035	1043	1047	1055	1069	1087	1110	1134	1158	1183
	Percentage change, annual rate	20.1	-26.8	76.6	42.5	25.7	10.1	8.4	10.9	15.2	-5.3	-21.2	-21.3	-6.7	0.5	4.2	3.4	1.4	3.2	5.2	7.1	6.6	6.9	6.9	
Change in private inventories	Billions of dollars	-14	-298	37	51	-102	-159	-55	240	257	145	71	162	17	41	29	16	13	24	24	36	53	72	85	94
Government Consumption Expenditures and Gross Investment	Billions of dollars	3883	3952	3923	3958	4086	4124	4183	4247	4311	4413	4493	4575	4655	4686	4726	4773	4819	4868	4912	4953	4993	5034	5075	5118
	Percentage change, annual rate	6.6	7.3	-2.9	3.6	13.9	3.5	5.8	6.2	6.2	9.7	7.5	7.5	7.1	2.7	3.4	4.1	3.9	4.1	3.6	3.4	3.3	3.3	3.4	
Federal	Billions of dollars	1456	1560	1525	1541	1620	1608	1596	1613	1623	1657	1694	1740	1748	1760	1774	1786	1803	1817	1830	1841	1854	1867	1882	
	Percentage change, annual rate	5.1	31.9	-8.6	4.3	22.1	-3.0	-3.1	4.4	0.1	2.4	8.7	9.2	11.4	1.9	2.7	3.1	2.7	4.0	3.1	2.8	2.5	2.8	2.9	
State and local	Billions of dollars	2427	2392	2398	2417	2468	2516	2588	2634	2698	2790	2836	2882	2915	2938	2966	2999	3034	3065	3095	3123	3152	3180	3208	3237
	Percentage change, annual rate	7.5	-5.7	1.0	3.2	8.9	8.0	11.8	7.3	10.1	14.3	6.7	6.6	4.7	3.1	3.9	4.6	4.7	4.2	3.9	3.7	3.8	3.7	3.5	
Net Exports of Goods and Services	Billions of dollars	-523	-526	-692	-769	-809	-834	-889	-915	-1117	-1036	-891	-857	-844	-905	-910	-888	-863	-853	-858	-867	-872	-882	-894	-905
	Percentage change, annual rate	2413	1818	2107	2258	2369	2503	2553	2733	2811	3039	3065	2988	3026	3015	3022	3041	3059	3080	3099	3118	3140	3167	3196	3227
Exports	Billions of dollars	-17.1	-67.8	80.5	32.0	21.2	24.6	8.3	31.3	11.9	36.5	3.5	-9.6	5.1	-1.4	0.9	2.5	2.4	2.8	2.5	2.5	2.9	3.4	3.7	3.9
	Percentage change, annual rate	2935	2344	2799	3026	3178	3338	3443	3648	3928	4074	3956	3845	3870	3921	3931	3929	3922	3933	3957	3985	4012	4049	4090	4132
Imports	Billions of dollars	-13.4	-59.4	103.4	36.7	21.5	21.7	13.2	26.1	34.5	15.8	-11.1	-10.7	2.6	5.3	1.1	-0.2	-0.7	1.1	2.4	2.9	2.8	3.7	4.1	4.2
	Percentage change, annual rate	-422	-525	-665	-758	-779	-844	-915	-908	-1110	-1021	-962	-887	-955	-1015	-1026	-1016	-1002	-1004	-1019	-1033	-1043	-1057	-1068	-1073
Memorandum: Balance on Current Account	Billions of dollars																								
<b>Components of GDP (Real)</b>																									
Personal Consumption Expenditures	Billions of chained (2012) dollars	13017	11817	12922	13047	13387	13774	13874	13982	14028	14100	14179	14215	14347	14387	14407	14403	14417	14441	14488	14558	14634	14705	14780	14849
	Percentage change, annual rate	-6.2	-32.1	43.0	3.9	10.8	12.1	3.0	3.1	1.3	2.0	2.3	1.0	3.8	1.1	0.6	-0.1	0.4	0.7	1.3	1.9	2.1	1.9	2.0	
Gross Private Domestic Investment	Billions of chained (2012) dollars	3410	2884	3394	3538	3489	3497	3584	3842	3893	3747	3654	3694	3583	3641	3636	3623	3620	3643	3669	3709	3755	3810	3860	3909
	Percentage change, annual rate	-5.1	-48.8	91.8	18.0	-5.4	0.9	10.4	32.0	5.4	-14.1	-9.6	4.5	-11.5	6.6	-0.5	-1.5	-0.3	2.5	2.9	4.4	5.1	6.0	5.4	
Nonresidential fixed investment	Billions of chained (2012) dollars	2761	2531	2650	2723	2781	2848	2852	2860	2915	2916	2960	2999	3030	3031	3025	3026	3039	3060	3083	3104	3132	3161	3191	
	Percentage change, annual rate	-8.2	-29.4	20.3	11.5	8.9	9.9	0.6	1.1	7.9	0.1	6.2	4.0	1.4	4.2	0.1	-0.8	0.2	1.7	2.8	3.0	2.8	3.6	3.7	
Residential fixed investment	Billions of chained (2012) dollars	637	588	663	712	732	723	712	710	705	671	620	577	569	570	574	575	574	575	580	587	596	606	615	625
	Percentage change, annual rate	17.4	-27.4	61.6	33.4	11.6	-4.9	-5.8	-1.1	-3.1	-17.8	-27.1	-25.1	-5.4	1.1	2.3	1.0	-0.9	1.1	3.1	5.0	6.5	6.7	6.4	
Change in private inventories	Billions of chained (2012) dollars	-34	-279	37	58	-83	-144	-49	198	215	110	39	137	7	34	24	13	10	19	19	29	43	59	69	77
Government Consumption Expenditures and Gross Investment	Billions of chained (2012) dollars	3388	3448	3396	3395	3449	3422	3421	3413	3393	3380	3411	3443	3486	3488	3493	3502	3508	3519	3525	3530	3534	3539	3544	3551
	Percentage change, annual rate	3.3	7.3	-5.9	-0.1	6.5	-3.0	-0.2	-1.0	-2.3	-1.6	3.7	3.8	5.2	0.2	0.6	1.0	0.7	1.2	0.7	0.5	0.5	0.6	0.6	
Federal	Billions of chained (2012) dollars	1308	1401	1361	1367	1422	1397	1371	1372	1353	1341	1354	1373	1398	1394	1392	1392	1392	1396	1397	1398	1398	1399	1400	1403
	Percentage change, annual rate	3.7	31.5	-10.9	1.8	17.3	-6.9	-7.2	0.0	-5.3	-3.4	3.7	5.8	7.6	-1.2	-0.6	0.2	-0.2	1.3	0.3	0.1	0.0	0.3	0.4	
State and local	Billions of chained (2012) dollars	2079	2049	2036	2030	2030	2028	2051	2043	2041	2038	2057	2070	2089	2095	2102	2110	2116	2122	2127	2131	2135	2140	2143	2147
	Percentage change, annual rate	3.0	-5.5	-2.5	-1.3	0.1	-0.4	4.5	-1.6	-0.4	-0.6	3.7	2.6	3.8	1.1	1.3	1.5	1.3	1.1	0.9	0.8	0.8	0.7	0.7	
Net Exports of Goods and Services	Billions of chained (2012) dollars	-828	-767	-991	-1104	-1165	-1204	-1268	-1298	-1489	-1431	-1269	-1239	-124											

This file presents data that supplement CBO's July 2023 report *An Update to the Economic Outlook: 2023 to 2025*.  
www.cbo.gov/publication/59258

**July 2023 Baseline Forecast—Data Release (Calendar Year)**

	Units	2020	2021	2022	2023	2024	2025
<b>Output</b>							
Gross Domestic Product (GDP)	Billions of dollars	21061	23315	25463	26821	27772	28998
	Percentage change, annual rate	-1.5	10.7	9.2	5.3	3.5	4.4
Gross National Product (GNP)	Billions of dollars	21258	23488	25640	26929	27849	29065
	Percentage change, annual rate	-1.9	10.5	9.2	5.0	3.4	4.4
Real GDP	Billions of chained (2012) dollars	18509	19610	20014	20318	20529	20978
	Percentage change, annual rate	-2.8	5.9	2.1	1.5	1.0	2.2
Real GNP	Billions of chained (2012) dollars	18685	19759	20158	20405	20591	21031
	Percentage change, annual rate	-3.1	5.7	2.0	1.2	0.9	2.1
Real Gross Value Added: Nonfarm Business	Billions of chained (2012) dollars	14091	15193	15540	15753	15926	16348
	Percentage change, annual rate	-3.5	7.8	2.3	1.4	1.1	2.7
<b>Potential GDP and Its Components</b>							
Potential GDP	Billions of dollars	22134	23548	25697	27137	28297	29419
	Percentage change, annual rate	3.1	6.4	9.1	5.6	4.3	4.0
Real Potential GDP	Billions of chained (2012) dollars	19455	19808	20198	20557	20917	21283
	Percentage change, annual rate	1.8	1.8	2.0	1.8	1.7	1.7
Potential Labor Force	Millions	164	165	166	166	167	168
	Percentage change, annual rate	0.2	0.4	0.4	0.2	0.4	0.5
Potential Labor Force Productivity	Ratio of potential GDP to potential labor force	118.3	120.0	121.8	123.7	125.5	127.0
	Percentage change, annual rate	1.6	1.5	1.5	1.6	1.4	1.3
Potential Labor Force Participation Rate	Percent	63.2	63.0	62.8	62.5	62.3	62.1
Noncyclical Rate of Unemployment	Percent	4.5	4.5	4.4	4.4	4.4	4.4
Output Gap	Percentage of Potential GDP	-4.9	-1.0	-0.9	-1.2	-1.9	-1.4
<b>Potential GDP and Its Components (Nonfarm Business Sector)</b>							
Real Potential GDP	Billions of chained (2012) dollars	15010	15328	15676	16006	16331	16663
	Percentage change, annual rate	2.2	2.1	2.3	2.1	2.0	2.0
Potential Hours Worked	2012=100	114.1	114.7	115.3	115.7	116.2	116.7
	Percentage change, annual rate	0.5	0.5	0.6	0.3	0.4	0.5
Capital Services Index	2012=100	122.5	125.1	128.1	131.0	133.5	136.0
	Percentage change, annual rate	2.2	2.1	2.4	2.3	1.9	1.9
Potential Total Factor Productivity	2012=100	106.9	108.1	109.3	110.5	111.7	112.9
	Percentage change, annual rate	1.0	1.1	1.1	1.1	1.1	1.1
Potential Labor Productivity	Ratio of potential GDP to potential hours worked in the NFB sector	68.6	69.7	70.9	72.2	73.3	74.5
	Percentage change, annual rate	1.7	1.6	1.7	1.8	1.6	1.5
Capital Share of Income	Ratio	0.3	0.3	0.3	0.3	0.3	0.3
<b>Prices</b>							

Price Index, Personal Consumption Expenditures (PCE)	2012=100	111.1	115.6	122.9	127.6	131.1	134.2
	Percentage change, annual rate	1.1	4.0	6.3	3.9	2.8	2.3
Price Index, PCE, Excluding food and energy	2012=100	113.5	117.4	123.3	128.7	132.8	136.2
	Percentage change, annual rate	1.3	3.5	5.0	4.4	3.2	2.6
Consumer Price Index, All Urban Consumers (CPI-U)	1982-84=100	258.9	271.0	292.6	304.8	313.7	321.0
	Percentage change, annual rate	1.3	4.7	8.0	4.2	2.9	2.3
CPI-U, Excluding Food and Energy	1982-84=100	267.7	277.3	294.3	309.0	319.8	327.9
	Percentage change, annual rate	1.7	3.6	6.1	5.0	3.5	2.5
Chained CPI-U	Dec 1999=100	145.4	151.9	163.9	170.7	175.1	178.6
	Percentage change, annual rate	1.1	4.5	7.8	4.2	2.6	2.0
GDP Price Index	2012=100	113.8	118.9	127.2	132.0	135.3	138.2
	Percentage change, annual rate	1.3	4.5	7.0	3.8	2.5	2.2
Employment Cost Index (ECI), Private Wages and Salaries	December 2005=100	141.4	147.0	154.8	162.4	169.6	176.0
	Percentage change, annual rate	2.9	4.0	5.3	4.9	4.4	3.7
Refiners' Acquisition Cost of Crude Oil, Imported	Dollars per barrel	37.3	65.4	91.9	69.5	66.8	65.2
Price of Crude Oil, West Texas Intermediate (WTI)	Dollars per barrel	39.2	68.0	94.8	74.5	70.1	68.1
Price of Natural Gas, Henry Hub	Dollars per MMBtu	2.0	3.9	6.4	2.5	3.2	3.8
FHFA House Price Index, Purchase Only	1991Q1=100	288.6	336.9	384.3	389.7	393.2	401.8
Nominal Exchange Rate Index (Export Weighted)	1970Q1=100	211.5	202.3	215.3	213.3	208.8	205.2
<b>Labor</b>							
Unemployment Rate, Civilian, 16 Years or Older	Percent	8.1	5.4	3.6	3.7	4.5	4.6
Labor Force, Civilian, 16 Years or Older	Millions	161	161	164	166	167	167
	Percentage change, annual rate	-1.7	0.3	1.9	1.3	0.3	0.3
Labor Force Participation Rate, 16 Years or Older	Percent	61.8	61.7	62.2	62.5	62.3	62.1
Employment, Civilian, 16 Years or Older (Household Survey)	Millions	148	153	158	160	159	160
	Percentage change, annual rate	-6.2	3.2	3.7	1.2	-0.5	0.3
Employment, Total Nonfarm (Establishment Survey)	Millions	142	146	153	156	157	157
	Percentage change, annual rate	-5.8	2.9	4.3	2.3	0.4	-0.1
Labor Productivity (Nonfarm Business Sector)	2012=100	112.6	115.0	113.1	113.0	114.6	118.3
	Percentage change, annual rate	4.4	2.2	-1.7	-0.1	1.5	3.2
Hours of All Persons (Nonfarm Business Sector)	2012=100	103.9	109.5	114.0	115.7	115.2	114.6
	Percentage change, annual rate	-7.5	5.5	4.0	1.5	-0.4	-0.5
<b>Population</b>							
Noninstitutional Population, Civilian, 16 Years or Older	Millions	260	261	264	266	268	270
	Percentage change, annual rate	0.4	0.4	1.0	0.8	0.6	0.8
Households (Total Occupied Housing Units)	Millions	126	127	128	130	130	131
<b>Interest Rates</b>							
10-Year Treasury Note	Percent	0.9	1.4	3.0	3.8	4.0	3.7
3-Month Treasury Bill	Percent	0.4	0.0	2.0	5.1	4.7	3.6
Federal Funds Rate	Percent	0.4	0.1	1.7	5.0	5.0	3.9
<b>Income</b>							
Income, Personal	Billions of dollars	19832	21295	21777	23059	24204	25175

	Percentage of GDP	94.2	91.3	85.5	86.0	87.2	86.8
Compensation of Employees, Paid	Billions of dollars	11593	12539	13565	14228	14919	15571
	Percentage of GDP	55.0	53.8	53.3	53.0	53.7	53.7
Wages and Salaries	Billions of dollars	9457	10290	11190	11739	12290	12793
	Percentage of GDP	44.9	44.1	43.9	43.8	44.3	44.1
Nonwage Income	Billions of dollars	5458	5680	5974	6539	6883	7075
	Percentage of GDP	25.9	24.4	23.5	24.4	24.8	24.4
Proprietors' income, farm, with IVA & CCAAdj	Billions of dollars	45	51	92	96	82	74
	Percentage of GDP	0.2	0.2	0.4	0.4	0.3	0.3
Proprietors' income, nonfarm, with IVA & CCAAdj	Billions of dollars	1598	1702	1757	1819	1897	1990
	Percentage of GDP	7.6	7.3	6.9	6.8	6.8	6.9
Income, rental, with CCAAdj	Billions of dollars	720	724	782	864	878	874
	Percentage of GDP	3.4	3.1	3.1	3.2	3.2	3.0
Interest income, personal	Billions of dollars	1647	1659	1727	2101	2352	2427
	Percentage of GDP	7.8	7.1	6.8	7.8	8.5	8.4
Dividend income, personal	Billions of dollars	1448	1544	1617	1659	1674	1711
	Percentage of GDP	6.9	6.6	6.4	6.2	6.0	5.9
Profits, Corporate, With IVA & CCAAdj	Billions of dollars	2260	2771	2953	2644	2630	2910
	Percentage of GDP	10.7	11.9	11.6	9.9	9.5	10.0
Profits, Corporate, Domestic, With IVA & CCAAdj	Billions of dollars	1831	2359	2499	2185	2138	2377
	Percentage of GDP	8.7	10.1	9.8	8.1	7.7	8.2
<b>Components of GDP (Nominal)</b>							
Personal Consumption Expenditures	Billions of dollars	14116	15903	17357	18355	18983	19785
	Percentage change, annual rate	-1.9	12.7	9.1	5.8	3.4	4.2
Gross Private Domestic Investment	Billions of dollars	3643	4114	4633	4642	4760	5046
	Percentage change, annual rate	-4.3	12.9	12.6	0.2	2.5	6.0
Nonresidential fixed investment	Billions of dollars	2798	3025	3347	3586	3672	3824
	Percentage change, annual rate	-4.2	8.1	10.6	7.1	2.4	4.1
Residential fixed investment	Billions of dollars	901	1108	1127	1031	1065	1146
	Percentage change, annual rate	10.8	23.0	1.7	-8.5	3.2	7.7
Change in private inventories	Billions of dollars	-56	-19	159	26	24	76
Government Consumption Expenditures and Gross Investment	Billions of dollars	3929	4161	4448	4710	4888	5055
	Percentage change, annual rate	4.5	5.9	6.9	5.9	3.8	3.4
Federal	Billions of dollars	1521	1609	1647	1756	1809	1861
	Percentage change, annual rate	7.4	5.8	2.3	6.6	3.0	2.9
State and local	Billions of dollars	2408	2552	2801	2954	3079	3194
	Percentage change, annual rate	2.7	5.9	9.8	5.5	4.2	3.7
Net Exports of Goods and Services	Billions of dollars	-628	-862	-975	-887	-860	-888
Exports	Billions of dollars	2149	2540	2976	3026	3089	3182
	Percentage change, annual rate	-15.4	18.2	17.2	1.7	2.1	3.0
Imports	Billions of dollars	2776	3401	3951	3913	3949	4071
	Percentage change, annual rate	-10.9	22.5	16.2	-1.0	0.9	3.1
Memorandum: Balance on Current Account	Billions of dollars	-593	-861	-995	-1003	-1015	-1060

**Components of GDP (Real)**

Personal Consumption Expenditures	Billions of chained (2012) dollars	12701	13754	14130	14386	14476	14742
	Percentage change, annual rate	-3.0	8.3	2.7	1.8	0.6	1.8
Gross Private Domestic Investment	Billions of chained (2012) dollars	3307	3603	3747	3621	3660	3834
	Percentage change, annual rate	-5.3	9.0	4.0	-3.4	1.1	4.7
Nonresidential fixed investment	Billions of chained (2012) dollars	2666	2835	2945	3021	3052	3147
	Percentage change, annual rate	-4.9	6.4	3.9	2.6	1.0	3.1
Residential fixed investment	Billions of chained (2012) dollars	650	719	643	572	579	611
	Percentage change, annual rate	7.2	10.7	-10.6	-11.1	1.2	5.5
Change in private inventories	Billions of chained (2012) dollars	-55	-19	125	19	20	62
Government Consumption Expenditures and Gross Investment	Billions of chained (2012) dollars	3407	3426	3407	3492	3520	3542
	Percentage change, annual rate	2.6	0.6	-0.6	2.5	0.8	0.6
Federal	Billions of chained (2012) dollars	1359	1391	1355	1394	1396	1400
	Percentage change, annual rate	6.2	2.3	-2.5	2.9	0.1	0.3
State and local	Billions of chained (2012) dollars	2049	2038	2051	2099	2124	2141
	Percentage change, annual rate	0.4	-0.5	0.7	2.3	1.2	0.8
Net Exports of Goods and Services	Billions of chained (2012) dollars	-923	-1233	-1357	-1256	-1189	-1199
Exports	Billions of chained (2012) dollars	2232	2367	2534	2613	2651	2716
	Percentage change, annual rate	-13.2	6.1	7.1	3.1	1.4	2.5
Imports	Billions of chained (2012) dollars	3154	3600	3891	3869	3839	3914
	Percentage change, annual rate	-9.0	14.1	8.1	-0.6	-0.8	1.9

Source: Congressional Budget Office.

Actual values reflect data released as of June 22, 2023. Forecast values are shaded.

For details on the calculation of potential output, see Robert Shackleton, *Estimating and Projecting Potential Output Using CBO's Forecasting Growth Model*, Working Paper 2018-03 (Congressional Budget Office, February 2018), [www.cbo.gov/publication/53558](http://www.cbo.gov/publication/53558).

CCAdj = capital consumption adjustment; FHFA = Federal Housing Finance Agency; IVA = inventory valuation adjustment; MMBtu = 1 million British thermal units; NFB = nonfarm business.

This file presents data that supplement CBO's July 2023 report *An Update to the Economic Outlook: 2023 to 2025*.  
www.cbo.gov/publication/59258

**July 2023 Baseline Forecast—Data Release (Fiscal Year)**

	Units	2020	2021	2022	2023	2024	2025
<b>Output</b>							
Gross Domestic Product (GDP)	Billions of dollars	21061	22654	25016	26571	27507	28679
	Percentage change, annual rate	-0.5	7.6	10.4	6.2	3.5	4.3
Gross National Product (GNP)	Billions of dollars	21281	22822	25200	26691	27593	28745
	Percentage change, annual rate	-0.8	7.2	10.4	5.9	3.4	4.2
Real GDP	Billions of chained (2012) dollars	18582	19339	19970	20274	20452	20856
	Percentage change, annual rate	-1.8	4.1	3.3	1.5	0.9	2.0
Real GNP	Billions of chained (2012) dollars	18779	19487	20122	20370	20521	20908
	Percentage change, annual rate	-2.0	3.8	3.3	1.2	0.7	1.9
Real Gross Value Added: Nonfarm Business	Billions of chained (2012) dollars	14147	14930	15514	15728	15857	16232
	Percentage change, annual rate	-2.4	5.5	3.9	1.4	0.8	2.4
<b>Potential GDP and Its Components</b>							
Potential GDP	Billions of dollars	21957	23087	25186	26825	28012	29139
	Percentage change, annual rate	3.2	5.1	9.1	6.5	4.4	4.0
Real Potential GDP	Billions of chained (2012) dollars	19373	19712	20104	20468	20827	21190
	Percentage change, annual rate	1.9	1.7	2.0	1.8	1.8	1.7
Potential Labor Force	Millions	164	165	166	166	167	167
	Percentage change, annual rate	0.2	0.3	0.5	0.2	0.3	0.5
Potential Labor Force Productivity	Ratio of potential GDP to potential labor force	117.9	119.6	121.4	123.3	125.0	126.6
	Percentage change, annual rate	1.6	1.5	1.5	1.6	1.4	1.3
Potential Labor Force Participation Rate	Percent	63.3	63.1	62.9	62.6	62.3	62.2
Noncyclical Rate of Unemployment	Percent	4.5	4.5	4.4	4.4	4.4	4.4
Output Gap	Percentage of Potential GDP	-4.1	-1.9	-0.7	-0.9	-1.8	-1.6
<b>Potential GDP and Its Components (Nonfarm Business Sector)</b>							
Real Potential GDP	Billions of chained (2012) dollars	14936	15242	15591	15924	16250	16579
	Percentage change, annual rate	2.3	2.1	2.3	2.1	2.0	2.0
Potential Hours Worked	2012=100	114.0	114.5	115.2	115.6	116.0	116.6
	Percentage change, annual rate	0.5	0.5	0.6	0.3	0.4	0.5
Capital Services Index	2012=100	121.9	124.4	127.3	130.4	132.9	135.3
	Percentage change, annual rate	2.4	2.0	2.4	2.4	1.9	1.8
Potential Total Factor Productivity	2012=100	106.6	107.8	109.0	110.2	111.4	112.6
	Percentage change, annual rate	1.0	1.1	1.1	1.1	1.1	1.1
Potential Labor Productivity	Ratio of potential GDP to potential hours worked in the NFB sector	68.4	69.4	70.6	71.9	73.1	74.2
	Percentage change, annual rate	1.7	1.6	1.7	1.8	1.7	1.5
Capital Share of Income	Ratio	0.3	0.3	0.3	0.3	0.3	0.3
<b>Prices</b>							
Price Index, Personal Consumption Expenditures (PCE)	2012=100	110.8	114.0	121.2	126.6	130.3	133.5
	Percentage change, annual rate	1.2	2.9	6.3	4.4	3.0	2.4
Price Index, PCE, Excluding food and energy	2012=100	113.1	116.0	121.8	127.4	131.9	135.4
	Percentage change, annual rate	1.4	2.6	5.0	4.6	3.5	2.6
Consumer Price Index, All Urban Consumers (CPI-U)	1982-84=100	258.1	266.6	287.7	302.3	311.6	319.2
	Percentage change, annual rate	1.5	3.3	7.9	5.1	3.1	2.4
CPI-U, Excluding Food and Energy	1982-84=100	266.6	273.9	290.1	305.7	317.5	326.0
	Percentage change, annual rate	1.9	2.7	5.9	5.4	3.9	2.7
Chained CPI-U	Dec 1999=100	145.0	149.7	161.0	169.5	174.1	177.8
	Percentage change, annual rate	1.1	3.2	7.6	5.2	2.8	2.1
GDP Price Index	2012=100	113.4	117.2	125.3	131.1	134.5	137.5
	Percentage change, annual rate	1.3	3.4	6.9	4.6	2.6	2.2
Employment Cost Index (ECI), Private Wages and Salaries	December 2005=100	140.4	145.3	152.9	160.5	167.9	174.4
	Percentage change, annual rate	3.0	3.5	5.2	5.0	4.6	3.8
Refiners' Acquisition Cost of Crude Oil, Imported	Dollars per barrel	41.0	57.2	90.7	72.0	67.4	65.5
Price of Crude Oil, West Texas Intermediate (WTI)	Dollars per barrel	42.9	59.2	93.5	77.3	70.6	68.5
Price of Natural Gas, Henry Hub	Dollars per MMBtu	2.0	3.4	6.2	3.3	3.0	3.7
FHFA House Price Index, Purchase Only	1991Q1=100	280.9	323.3	376.8	389.4	391.5	399.4
Nominal Exchange Rate Index (Export Weighted)	1970Q1=100	212.4	201.9	211.3	215.9	209.7	206.4
<b>Labor</b>							
Unemployment Rate, Civilian, 16 Years or Older	Percent	7.3	6.0	3.8	3.6	4.4	4.6
Labor Force, Civilian, 16 Years or Older	Millions	162	161	164	166	167	167
	Percentage change, annual rate	-0.9	-0.5	1.7	1.4	0.5	0.3
Labor Force Participation Rate, 16 Years or Older	Percent	62.2	61.6	62.2	62.5	62.4	62.1
Employment, Civilian, 16 Years or Older (Household Survey)	Millions	150	151	157	160	159	160
	Percentage change, annual rate	-4.5	0.8	4.1	1.6	-0.3	0.1
Employment, Total Nonfarm (Establishment Survey)	Millions	144	145	151	156	157	157
	Percentage change, annual rate	-4.0	0.1	4.6	2.8	0.8	-0.1
Labor Productivity (Nonfarm Business Sector)	2012=100	111.3	114.6	113.6	113.0	114.0	117.4
	Percentage change, annual rate	3.9	3.0	-0.9	-0.5	0.8	3.0
Hours of All Persons (Nonfarm Business Sector)	2012=100	105.5	108.0	113.3	115.4	115.4	114.7
	Percentage change, annual rate	-5.9	2.3	4.9	1.9	0.0	-0.6
<b>Population</b>							
Noninstitutional Population, Civilian, 16 Years or Older	Millions	260	261	263	266	267	269
	Percentage change, annual rate	0.5	0.4	0.8	0.9	0.6	0.8
Households (Total Occupied Housing Units)	Millions	125	126	128	130	130	131
<b>Interest Rates</b>							
10-Year Treasury Note	Percent	1.1	1.3	2.4	3.7	4.0	3.8
3-Month Treasury Bill	Percent	0.7	0.1	1.0	4.8	5.0	3.8
Federal Funds Rate	Percent	0.8	0.1	0.8	4.6	5.2	4.1
<b>Income</b>							
Income, Personal	Billions of dollars	19594	20954	21507	22726	23961	24922
	Percentage of GDP	93.0	92.5	86.0	85.5	87.1	86.9
Compensation of Employees, Paid	Billions of dollars	11504	12271	13369	14062	14750	15410
	Percentage of GDP	54.6	54.2	53.4	52.9	53.6	53.7
Wages and Salaries	Billions of dollars	9380	10049	11023	11602	12161	12666
	Percentage of GDP	44.5	44.4	44.1	43.7	44.2	44.2
Nonwage Income	Billions of dollars	5449	5617	5891	6379	6836	7015



Proprietors' income, farm, with IVA & CCAAdj	Percentage of GDP	25.9	24.8	23.6	24.0	24.9	24.5
	Billions of dollars	36	59	78	98	86	75
Proprietors' income, nonfarm, with IVA & CCAAdj	Percentage of GDP	0.2	0.3	0.3	0.4	0.3	0.3
	Billions of dollars	1589	1673	1748	1802	1878	1964
Income, rental, with CCAAdj	Percentage of GDP	7.5	7.4	7.0	6.8	6.8	6.8
	Billions of dollars	718	718	764	848	878	873
Interest income, personal	Percentage of GDP	3.4	3.2	3.1	3.2	3.2	3.0
	Billions of dollars	1652	1656	1694	1980	2325	2405
Dividend income, personal	Percentage of GDP	7.8	7.3	6.8	7.5	8.5	8.4
	Billions of dollars	1454	1511	1609	1651	1671	1698
Profits, Corporate, With IVA & CCAAdj	Percentage of GDP	6.9	6.7	6.4	6.2	6.1	5.9
	Billions of dollars	2283	2640	2934	2740	2593	2836
Profits, Corporate, Domestic, With IVA & CCAAdj	Percentage of GDP	10.8	11.7	11.7	10.3	9.4	9.9
	Billions of dollars	1827	2235	2492	2281	2110	2313
	Percentage of GDP	8.7	9.9	10.0	8.6	7.7	8.1
<b>Components of GDP (Nominal)</b>							
Personal Consumption Expenditures	Billions of dollars	14124	15420	17049	18147	18813	19578
	Percentage change, annual rate	-1.0	9.2	10.6	6.4	3.7	4.1
Gross Private Domestic Investment	Billions of dollars	3606	3971	4590	4642	4716	4966
	Percentage change, annual rate	-4.9	10.1	15.6	1.1	1.6	5.3
Nonresidential fixed investment	Billions of dollars	2815	2964	3258	3550	3644	3782
	Percentage change, annual rate	-2.8	5.3	9.9	9.0	2.6	3.8
Residential fixed investment	Billions of dollars	855	1073	1153	1030	1054	1122
	Percentage change, annual rate	6.3	25.5	7.5	-10.7	2.2	6.5
Change in private inventories	Billions of dollars	-65	-66	178	62	19	62
Government Consumption Expenditures and Gross Investment	Billions of dollars	3895	4089	4366	4660	4843	5014
	Percentage change, annual rate	4.9	5.0	6.8	6.7	3.9	3.5
Federal	Billions of dollars	1495	1591	1626	1736	1795	1848
	Percentage change, annual rate	6.9	6.5	2.2	6.7	3.4	3.0
State and local	Billions of dollars	2400	2497	2740	2925	3048	3166
	Percentage change, annual rate	3.7	4.0	9.7	6.8	4.2	3.9
Net Exports of Goods and Services	Billions of dollars	-564	-825	-990	-879	-865	-879
Exports	Billions of dollars	2216	2421	2912	3013	3070	3155
	Percentage change, annual rate	-12.7	9.2	20.3	3.5	1.9	2.8
Imports	Billions of dollars	2780	3246	3902	3892	3935	4034
	Percentage change, annual rate	-11.7	16.8	20.2	-0.2	1.1	2.5
Memorandum: Balance on Current Account	Billions of dollars	-506	-824	-1000	-971	-1010	-1050
<b>Components of GDP (Real)</b>							
Personal Consumption Expenditures	Billions of chained (2012) dollars	12746	13520	14072	14339	14437	14669
	Percentage change, annual rate	-2.1	6.1	4.1	1.9	0.7	1.6
Gross Private Domestic Investment	Billions of chained (2012) dollars	3286	3527	3784	3639	3638	3784
	Percentage change, annual rate	-5.9	7.3	7.3	-3.8	0.0	4.0
Nonresidential fixed investment	Billions of chained (2012) dollars	2690	2801	2913	3012	3038	3120
	Percentage change, annual rate	-3.5	4.1	4.0	3.4	0.8	2.7
Residential fixed investment	Billions of chained (2012) dollars	625	720	677	572	576	601
	Percentage change, annual rate	3.6	15.2	-6.0	-15.4	0.6	4.4
Change in private inventories	Billions of chained (2012) dollars	-68	-54	140	50	16	50
Government Consumption Expenditures and Gross Investment	Billions of chained (2012) dollars	3398	3422	3399	3477	3513	3537
	Percentage change, annual rate	3.3	0.7	-0.7	2.3	1.0	0.7
Federal	Billions of chained (2012) dollars	1341	1389	1355	1389	1394	1399
	Percentage change, annual rate	5.9	3.6	-2.5	2.5	0.4	0.3
State and local	Billions of chained (2012) dollars	2057	2035	2044	2089	2119	2137
	Percentage change, annual rate	1.8	-1.1	0.5	2.2	1.4	0.9
Net Exports of Goods and Services	Billions of chained (2012) dollars	-855	-1185	-1371	-1256	-1201	-1193
Exports	Billions of chained (2012) dollars	2296	2329	2506	2604	2637	2697
	Percentage change, annual rate	-10.6	1.4	7.6	3.9	1.3	2.3
Imports	Billions of chained (2012) dollars	3151	3514	3877	3860	3838	3890
	Percentage change, annual rate	-9.5	11.5	10.3	-0.4	-0.6	1.4

Source: Congressional Budget Office.

Actual values reflect data released as of June 22, 2023. Forecast values are shaded.

For details on the calculation of potential output, see Robert Shackleton, *Estimating and Projecting Potential Output Using CBO's Forecasting Growth Model*, Working Paper 2018-03 (Congressional Budget Office, February 2018), [www.cbo.gov/publication/53555](http://www.cbo.gov/publication/53555).

CCAAdj = capital consumption adjustment; FHFA = Federal Housing Finance Agency; IVA = inventory valuation adjustment; MMBtu = 1 million British thermal units; NFB = nonfarm business.



Exh. RF-6  
Docket UE-230172  
Witness: Ryan Fuller

**BEFORE THE WASHINGTON  
UTILITIES AND TRANSPORTATION COMMISSION**

WASHINGTON UTILITIES AND  
TRANSPORTATION COMMISSION,

Complainant,

v.

PACIFICORP dba  
PACIFIC POWER & LIGHT COMPANY

Respondent.

Docket UE-230172  
*(Consolidated)*

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In the Matter of

ALLIANCE OF WESTERN ENERGY  
CONSUMERS'

Petition for Order Approving Deferral of  
Increased Fly Ash Revenues

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Docket UE-210852  
*(Consolidated)*

**PACIFICORP**

**EXHIBIT OF RYAN FULLER**

**WIEC Response to RMP Data Request 2.2**

**October 2023**

WIEC's Responses to RMP's Second Set of Data Requests  
Docket No. 20000-633-ER-23

**RMP 2.2:** Refer to WIEC Exhibit No. 202, Page 82, Lines 8-10: Please provide calculations supporting the derivation of the stated annualized inflation rates of 6.418% and 6.409%, using the Gross Domestic Product ("GDP") implicit price deflator for calendar years 2021 and 2022, respectively.

**RESPONSE:**

Please refer to WIEC Exhibit No. 202.8. The referenced values were calculated by comparing the Q4 implicit price deflators of 2021 and 2022 to the previous year. The 2021 value was calculated by dividing 118.37 (the 2021 Q4 implicit price deflator) by 113.63 (the 2020 Q4 implicit price deflator). Similarly, the 2022 value was calculated by dividing 127.21 (the 2022 Q4 implicit price deflator) by 118.37 (the 2021 Q4 implicit price deflator).

Respondent: Bradley G. Mullins

Witness: Bradley G. Mullins

Exh. RF-7  
Docket UE-230172  
Witness: Ryan Fuller

**BEFORE THE WASHINGTON  
UTILITIES AND TRANSPORTATION COMMISSION**

WASHINGTON UTILITIES AND  
TRANSPORTATION COMMISSION,

Complainant,

v.

PACIFICORP dba  
PACIFIC POWER & LIGHT COMPANY

Respondent.

Docket UE-230172  
*(Consolidated)*

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In the Matter of

ALLIANCE OF WESTERN ENERGY  
CONSUMERS'

Petition for Order Approving Deferral of  
Increased Fly Ash Revenues

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Docket UE-210852  
*(Consolidated)*

**PACIFICORP**

**EXHIBIT OF RYAN FULLER**

**WIEC Response to RMP Data Request 2.3**

**October 2023**

WIEC's Responses to RMP's Second Set of Data Requests  
Docket No. 20000-633-ER-23

**RMP 2.3:** Refer to WIEC Exhibit No. 202, Page 82, Lines 13-14: Please provide a workpaper with calculations intact supporting the assertion that “historically Core PCE Inflation has been approximately 1.6% less than the inflation rate measured using the GDP implicit price deflator.”

**RESPONSE:**

As noted in the federal reserve release identified in the footnote of the referenced sentence, actual Core PCE inflation was 4.7% and 4.8% in 2021 and 2022, respectively. The approximate 1.6% value was calculated by comparing those actual values to the 6.418% and 6.409% GDP Implicit Price deflator inflation for 2021 and 2022, respectively, as identified in the sentence preceding the referenced sentence. Note that the 1.6% was an approximation, as the average difference between the two inflation values during the two years was approximately 1.66%.

Respondent: Bradley G. Mullins

Witness: Bradley G. Mullins

Exh. RF-8  
Docket UE-230172  
Witness: Ryan Fuller

**BEFORE THE WASHINGTON  
UTILITIES AND TRANSPORTATION COMMISSION**

WASHINGTON UTILITIES AND  
TRANSPORTATION COMMISSION,

Complainant,

v.

PACIFICORP dba  
PACIFIC POWER & LIGHT COMPANY

Respondent.

Docket UE-230172  
*(Consolidated)*

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In the Matter of

ALLIANCE OF WESTERN ENERGY  
CONSUMERS'

Petition for Order Approving Deferral of  
Increased Fly Ash Revenues

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Docket UE-210852  
*(Consolidated)*

**PACIFICORP**

**EXHIBIT OF RYAN FULLER**

**Mullins Transcript from Oregon Docket No. UE 420**

**October 2023**

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THE PUBLIC UTILITY COMMISSION  
OF THE STATE OF OREGON

Docket No. UE 420

In the Matter of PacifiCorp, dba Pacific Power,  
2024 Transition Adjustment Mechanism.

September 7, 2023

9:30 a.m.

Evidentiary Hearing held before the Oregon Public Utility  
Commission via Zoom on September 7, 2023, beginning at  
9:30 a.m.

PRESENT:

Administrative Law Judge:	Katie Mapes
Commissioner:	Letha Tawney
On behalf of PacifiCorp:	Adam Lowney, Ajay Kumar Katherine McDowell
On behalf of Sierra Club:	Rose Monahan
On behalf of Calpine Energy Solutions:	Peter Richardson, Greg Adams
On behalf of Vitesse:	Irion Sanger, Joni Sliger
On behalf of AWEC:	Brent Coleman
On behalf of Staff:	Stephanie Andrus

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1 CROSS-EXAMINATION

2 BY MR. LOWNEY:

3 Q Good morning, Mr. Mullins.

4 A Morning.

5 Q I'd like to start out with your rebuttal  
6 testimony, please. That's AWEC/200. If you could turn to  
7 page 4.

8 A Okay.

9 Q And if I could direct your attention to line 15.

10 You testify:

11 "To develop a forecast with an overall end  
12 result that is reasonable, the forecast must be  
13 based on modeling assumptions that are both  
14 principled and consistent."

15 You see that?

16 A Yeah.

17 Q Okay. Now, with that testimony in mind, I'm  
18 going to ask you to flip to page 100, or excuse me, page  
19 16 of AWEC 100, which is your direct, or excuse me, your  
20 opening testimony.

21 And on page 16 of AWEC/100, you discuss your  
22 recommendation related to the production tax credit rate.

23 Are you there?

24 A Yup.

25 Q And you recommend an adjustment that would



1 increase the PTC to 3 cents per kWh in 2024; isn't that  
2 correct?

3 A Correct.

4 Q And on line 8 of page 16, you quantify that  
5 adjustment as a decrease to Oregon allocated NPC of 2.7  
6 million; is that correct?

7 A To the -- it's a reduction to the overall TAM  
8 revenues, not -- not net power costs, but that's  
9 the -- that's the right number.

10 Q Okay. That's -- thank you for that correction.

11 Now, further down on this same page, on line 11,  
12 you testify that:

13 "The IRS adjusts the PTC rate each year by  
14 applying an inflation adjustment factor."

15 And then on the next -- further down, you  
16 testify -- and actually let me, sorry, I need to flip  
17 pages -- on page 17, line 9, if you're there, you testify:

18 "It can be determined that the PTC rate  
19 will increase to 3 cents per kWh in 2024 so long  
20 as inflation equals or exceeds 3.13 percent on  
21 an annualized basis for the remainder of 2023."

22 You see that testimony?

23 A I do.

24 Q And then on line 11, you testify:

25 "It's likely that inflation will exceed

1           this level for the remainder of the year."

2           And you testify that you make that  
3 recommendation because "the annualized inflation rate for  
4 April 2023 was 4.9 percent," and that's down on line 13.

5           Now, your testimony doesn't say this, but the  
6 footnote citation supporting that 4.9 percent is relying  
7 on the Consumer Price Index, or the CPI; isn't that  
8 correct?

9           A     Yep.

10          Q     And to be clear, the CPI is not the inflation  
11 metric that actually determines whether the PTC rate  
12 increases or decreases. Isn't that correct?

13          A     Yep. That's right. That's right. In my -- I  
14 guess in my -- what is it? -- my rebuttal testimony,  
15 I -- I guess I talked some -- some about that and compared  
16 to the different inflation factor. What is it?  
17 The -- the -- the PC -- what is it? -- PCE factor.

18          Q     And we'll get there (indiscernible). I just  
19 want to --

20          A     Sure, sure. Just -- just to -- just to finish  
21 up though. So I did compare it to the PCE factor and did  
22 sort of a differential approach. And so recognizing that  
23 those -- those two aren't the -- aren't the same. It  
24 isn't the same as the inflation adjustment factor.

25          Q     And -- and just to be clear, the inflation

1 adjustment metric that is actually used to determine the  
2 PTC rate is called the Gross Domestic Product or GDP  
3 implicit price deflator. Correct?

4 A That's the -- that is the index that -- that the  
5 IRS uses.

6 Q Okay. Now, if I could direct your attention,  
7 please, to PacifiCorp Hearing Exhibit 1308, I'm going to  
8 ask you to first look at page 1, so just let me know when  
9 you're there.

10 A Okay.

11 Q Now, page 1 is the document that you cite in  
12 footnote 10 of your direct testimony that supports the 4.9  
13 percent inflation rate you cited in your direct -- or in  
14 your opening testimony, correct?

15 A And just for reference, the 4.9 percent is on  
16 the very first line of Table A. It says, "All items  
17 unadjusted 12 months ended April 2023," and it shows 4.9  
18 percent. Do you see that?

19 A Yeah. Yeah. I -- seems like this is the  
20 same -- same release, but I don't -- don't recall exactly  
21 what, you know, specific -- you know, what -- where it  
22 specifically was. So it might've been a different  
23 release, but yeah, it's -- it's there.

24 Q And -- and just to be clear, this release  
25 that -- that we're looking at was from April 2023, and it

1 was issued May 10th, 2023. That's at the very top of the  
2 document.

3 A Yeah.

4 Q And just to get our timing straight, your  
5 testimony was filed on June 23rd, your opening testimony.  
6 Is that correct?

7 A Correct.

8 Q Now, if we just turn to page 2 of Exhibit 1308,  
9 this is the same Consumer Price Index news release from  
10 June of 2023. And if we look at the top, it was released  
11 on July 12th, so shortly after you filed your opening  
12 testimony. And if we look on this document, the first  
13 line on Table A is no longer 4.9 percent. It's 3 percent.  
14 Isn't that right?

15 A Yeah, that's -- that's right. But that's the,  
16 you know, that's, of course, the backwards-  
17 looking -- looking value.

18 Q But --

19 A And, you know, the -- the inflation at least  
20 over the course of the year has softened some. You know,  
21 we don't know what's going to happen through -- through  
22 the end of the year, you know, based on, you know, the  
23 timing and the testimony that, you know, the information I  
24 reviewed at the time of filing testimony, I -- I think,  
25 you know, I thought it was more likely than not that it

1 was going to increase. And I -- and I still think that  
2 that's the case. But, you know, of course, it's  
3 not -- it's not a slam dunk in this case. It could go  
4 either way.

5 But given that it's, you know, a passthrough  
6 item in the P-CAM (phonetic), I think it's -- it's, at  
7 least for this item, best to sort of err in favor of  
8 customers and increase it rather than -- rather than not.

9 So -- but -- but, yeah, it has -- inflation has  
10 softened some.

11 Q And -- and so just to be clear, you would agree  
12 that according to this Consumer Price Index publication,  
13 which again is the same data you relied on in your opening  
14 testimony, inflation was now below the level you  
15 identified as necessary to adjust the PTC as of the time  
16 you filed your opening testimony?

17 And just to remind you testified --

18 A Yes.

19 Q -- is less than 3.13 percent or, put the other  
20 way, if inflation has to exceed 3.13 percent in order for  
21 the PTC to increase, and the document we're looking at  
22 from June shows inflation at less than that amount by the  
23 metric you chose to identify in your own testimony.

24 Correct?

25 A Right. So -- so just to be clear, the -- the

1 actual inflation has to be 4 percent for it to -- for it  
2 to trigger. The 3.1, I -- I think that you cited, I think  
3 that was just for the remainder of the year. So I think  
4 that's an important clarification.

5 But I guess the point is that's backwards-  
6 looking so we don't know what's, you know, what's going to  
7 happen through the -- through the end of the year.

8 Q Okay.

9 A And so --

10 Q I appreciate that. I just want to confirm.  
11 It -- it -- despite the fact it's backward-looking, that's  
12 the number you relied on in your own testimony, correct?  
13 The CPI figure, the backward-looking CPI.

14 A No, I mean, I looked at -- I looked at a number  
15 of different -- different factors and things, but --

16 Q But that's the one you're citing in opening  
17 testimony.

18 A -- based on what I had looked at when I filed  
19 testimony. I -- you know, and I still believe it's more  
20 likely to go up than not, but yeah, numbers are what they  
21 are.

22 Q Okay. Now, let's turn to your AWEC 200 and page  
23 41. And on -- beginning on line 16, you note that the  
24 Bureau of Economic Analysis published updated second  
25 quarter GPD implicit price deflator data. Do you see

1 that?

2 A It's on 41?

3 Q Yeah, beginning on line 16 and then continuing  
4 on through line 18.

5 A Yeah.

6 Q And you testify that on line -- beginning on  
7 line 18 that based on that data, the PTC will increase as  
8 long as inflation exceeds -- equals or exceeds 4 percent.  
9 And I think that's what you were just referencing.

10 Correct?

11 A Right. Right. So that's the difference between  
12 the 4 and the -- the -- the 3.1. That was just for the  
13 remaining three -- three quarters.

14 Q And -- and then going back to the CPI data we  
15 were just talking about that. That -- the data -- both  
16 the data you cited in your, or excuse me, the data  
17 in -- from July -- or June of 2023 shows the CPI is at 3  
18 percent, so well below the new 4 percent benchmark you  
19 identify in your rebuttal testimony, correct?

20 A Correct. However, the -- I think, you know,  
21 back to an earlier point, the -- in -- the implicit price  
22 deflator is different than the CPI, and it's different  
23 than the PCE. And when you compare it backwards-looking,  
24 it actually increases more than those inflation values.

25 So like, for example, in 2021 and 2022,

1 the -- the inflation measured by the implicit price  
2 deflator was 6.4 percent, actually in both years, slightly  
3 different rounding. So it actually comes in higher  
4 than -- than those or has come in higher than those  
5 metrics.

6 So, you know, you know, apples to apples between  
7 the different metrics is hard to do, but, you know, based  
8 on everything I -- I saw, I felt comfortable recommending  
9 an increase to -- to 3 cents.

10 Q Well, I understand that. And I just want to  
11 find out exactly what you said in your testimony. And so  
12 in your direct, you relied on the CPI; when you filed your  
13 rebuttal, the CPI index no longer supported your  
14 recommendation. And so on line 24, you now switched to  
15 the Core Personal Consumption Expenditures Inflation Index  
16 because it was higher than the CPI. Isn't that right?

17 A I guess I'd take issue with that, that I  
18 would -- that I would simply change something because it  
19 doesn't agree with my recommendation. I mean, I -- I use  
20 this information because it was recent information that  
21 I -- that I had. If I had used the -- the CPI value, I  
22 think it would show a similar analysis when, you know,  
23 when you compare it back to the implicit price deflator.

24 So -- so I think I would take issue with that.

25 Q Well, you just said you're using more recent



1 data, but on line 23, the Core PCE data you were using was  
2 from June 14th of 2023. So it's actually older than the  
3 data you were using when you prepared your opening  
4 testimony. Isn't that correct? So you're using older  
5 data from a different metric because it gave you a higher  
6 number.

7 A No, that's not right. The -- this was from  
8 June -- yeah, this is from June '23 -- yeah,  
9 twenty -- yeah, 14th, 2023.

10 Q So before you filed your opening.

11 A Yeah, the previous data was several months  
12 earlier.

13 Q Well, but this was available before you filed  
14 your opening testimony; isn't that correct?

15 A Sure, but it takes a lot of time to, you know,  
16 write and prepare that testimony, so -- and I'm not  
17 exactly sure when this actually gets, you know, published  
18 out on the web and all that -- that -- that stuff. So,  
19 you know, this was kind of the -- the most recent  
20 information I could find. And -- and, you know, there's  
21 lots of -- there's lots of metrics and lots of ways  
22 to -- to measure inflation. I think that's -- that's for  
23 sure.

24 But -- but to say that, you know, I'm -- I'm  
25 picking and choosing just to support a recommendation,

1 I -- I would -- I would disagree with that.

2 Q Well, and that's -- and that's fair, but just to  
3 be clear, your -- your testimony doesn't explain that you  
4 switched metrics, does it?

5 A I think my testimony speaks for itself. You  
6 know, I clearly cite where the numbers are coming from.  
7 So --

8 Q Okay. But you don't explain that you're using a  
9 different metric now based on data that predated your  
10 opening testimony. Correct?

11 A Is that a different question?

12 Q Okay. Well, let's move on. So the sentence  
13 that begins on line 23 of page 41 begins with:

14 "Recent Federal Reserve projections  
15 published on June 14, 2023, for example,  
16 forecast Core PCE Inflation of 3.7 to 4.2  
17 percent in the calendar year 2023, and  
18 historically Core PCE Inflation has been  
19 approximately 1.6 percent less than the  
20 inflation rate measured using the GDP implicit  
21 price deflator."

22 Now, there's a lot of factual statements you  
23 make in that sentence. And you have a citation, Footnote  
24 54, to a Federal Reserve Open Market committee document,  
25 correct?

1 A Yeah.

2 Q And to be clear of all the factual statements in  
3 that sentence, the only statement that is actually found  
4 in that Federal Reserve report is that the forecast Core  
5 PCE Inflation of 3.7 to 4.2 percent. Correct?

6 A Those are the values in -- in the report. You  
7 can mathematically compare those values to the implicit  
8 price deflator values in the prior sentence to -- to  
9 figure out the -- the 1.6 percent. So I think that speaks  
10 for itself.

11 Q Well, and just to be clear that when you  
12 say -- and you use the word "historically" on line 1 of  
13 page 42. You say, "Historically Core PCE Inflation has  
14 been approximately 1.6 percent less." And isn't it true  
15 that you calculated that number based on two years of  
16 data?

17 A It is correct. I -- I compared those -- those  
18 two years. That's -- that's right.

19 Q And isn't it also true that if you use more than  
20 two years of data, your results would have been different?  
21 That 1.6 percent would have been a different number.

22 A It could be. Those are -- those are the two  
23 years that I looked at. I mean, it was quite high  
24 relative to the PCE in '21 and '22.

25 Q And isn't it also true that the calculation you

1 performed to determine the change in the GDP implicit  
2 price deflator from year to year was based on the fourth  
3 quarter results of that metric?

4 A Yep, that's right. Yeah, the year end -- it's  
5 the year end value. That's what I use.

6 Q Okay. Now, if I could turn your attention,  
7 please, to PacifiCorp 1301. And this is your testimony  
8 from Docket UE 390, which was the TAM, the 2022 TAM, and  
9 just let me know when you're there.

10 A Okay.

11 Q If you could turn to page 5, please, and  
12 beginning on line 15, you testify that:

13 "The annual GDP implicit price deflator  
14 represents an average over the course of the  
15 calendar year. The annual GDP implicit price  
16 deflator is not, for example, based on the year  
17 end value."

18 And so isn't it true that when you calculated  
19 your 1.6 percent, not only did you only use two years of  
20 data, but you didn't calculate the GDP implicit price  
21 deflator correctly, according to the testimony you  
22 provided in the 2022 TAM?

23 MR. COLEMAN: I'm sorry (indiscernible).

24 THE WITNESS: No, that's not right.

25 MR. COLEMAN: Which page are we on? Which

1 page 5? Page 5 of the exhibit or page 5 of the original  
2 testimony?

3 MR. LOWNEY: Sorry. Page 5 of the original  
4 testimony.

5 MR. COLEMAN: Okay. Thank you.

6 BY MR. LOWNEY:

7 Q And I'm sorry. I can restate the question, Mr.  
8 Mullins.

9 A No, no, I think that's all right. I have kind  
10 of short memory, but yeah, so -- so no, that's -- that's  
11 not right. So the -- the -- the year end values were used  
12 because that compares to the -- that -- the 4 percent that  
13 I had calculated as -- as triggering the increase.  
14 So -- so that's the -- that's the 4 percent year -- change  
15 on a year-end-to-year-end basis to trigger the increase;  
16 although the increase itself is calculated on an average  
17 of the four quarters over the year.

18 So it's -- it's two different things. So when  
19 you talk about kind of the difference, it's -- it's  
20 really, you know, two different things that we're looking  
21 at.

22 Q Okay. And just to be clear, that's a  
23 calculation you developed on your own. Correct?

24 A So the --

25 Q The methodology you used --

1 A -- the 4 percent --

2 Q I can -- I can ask -- maybe it's a confusing  
3 question. So the -- the methodology you use to calculate  
4 the 1.6 percent based on two years of data, that's a  
5 calculation you performed yourself based on a methodology  
6 you created. Correct?

7 A Well, the -- so the -- the way that the implicit  
8 price deflator increases, that's defined by the IRS. And  
9 so they, you know, that's all kind of laid out, and they  
10 have their own -- own way of doing it.

11 And so in calculating those and figuring out how  
12 those factors have to change in order to trigger an  
13 increase, you know, that was a calculation that -- that I  
14 did. And in evaluating, you know, what changes, you know,  
15 what might, you know, cause it to increase above that  
16 level, I did, you know, calculations for that.

17 Q Okay. Let's move on. If I could direct your  
18 attention, please, to AWEC/200, this is your rebuttal  
19 testimony, on page 30.

20 A Okay.

21 Q Now, on line 3, the very last word there and  
22 then carrying on to line 4, you testify that:

23 "The AURORA model is producing levels of  
24 short-term purchase transactions that are  
25 inconsistent with historical levels."

1 Do you see that testimony?

2 A I do.

3 Q And I probably should have asked this question  
4 1st, but just for context, you're discussing here why it's  
5 reasonable to use your methodology for calculating the  
6 day-ahead to real-time adjustment. Correct?

7 A I wouldn't call it a methodology, but  
8 the -- yeah. So my -- what my proposal is, is to just use  
9 the -- the historical average rather than, you know,  
10 running through all the complications of the, you know,  
11 the different -- different pieces.

12 Q Okay. And as we just said, your -- your  
13 reasoning, at least as described on line 4, is that "The  
14 AURORA model is producing levels of short-term purchase  
15 transactions that are inconsistent with history," correct?

16 A Yeah, and then I'd have to pull up that  
17 confidential figure 5 here. Let me --

18 Q And -- and I could -- let me just direct your  
19 attention to AWEC/201, and that's a document titled  
20 "Mullins Proposed NPC Forecast." And looking at page 1.

21 A Okay. Let me pull that one up. Okay.

22 Q And actually, I misspoke. If I could direct  
23 your attention to page 4 of that document.

24 A Okay.

25 Q And I'd just like to ask you some questions

1 about your modeling results and the purchase levels  
2 included there. So if we look about halfway down, there's  
3 a line called "Total Short Term Firm Purchases," and it  
4 shows a figure that's rounded to \$88 million. Do you see  
5 that?

6 A I don't see that. So you're looking at AWEC/200  
7 Mullins/4?

8 Q AWEC/201 Mullins/4. This is your NPC report.

9 A AWEC/201. Okay.

10 Q And about halfway down, there's a "Total Short  
11 Term Firm Purchase" line, and it shows rounded results of  
12 \$88 million.

13 A Okay.

14 Q And then a little further down, there's another  
15 line that says "Total System Balancing Purchases," and  
16 that shows a rounded number of \$923 million.

17 A Okay.

18 Q You see that? And --

19 A Yup.

20 Q -- if you add those two numbers together, you're  
21 going to get a figure north of a billion dollars in total  
22 short-term purchases, correct?

23 A Right. Um-hum.

24 Q Okay. Now, do you have Mr. Mitchell's  
25 testimony?



1 A Um --

2 Q In particular --

3 A I do.

4 Q -- his Exhibit 403, which is the "Reply Update  
5 Net Power Cost Report."

6 A It's the -- the reply update. Okay.

7 Q And look at page 4. And in this document, you  
8 know, your report and Mr. Mitchell's report largely mirror  
9 one another in terms of their format. Obviously, the  
10 numbers are different.

11 So if we go to page 4 of Mr. Mitchell's exhibit  
12 and look at the same line for "Total Short Term Firm  
13 Purchases," it's actually the same number as yours. It's  
14 roughly \$88 million. Further down, the "Total System  
15 Balancing Purchases" in Mr. Mitchell's report is \$770  
16 million. Do you see those two figures?

17 A I do.

18 Q And if you add those together, it comes up with  
19 right around \$858 million in total purchases under the  
20 company's reply update, correct?

21 A Yep.

22 Q And so your modeling without the DA/RT price  
23 component produces higher levels of short-term purchases  
24 than PacifiCorp's modeling with the price component,  
25 correct?

1           A       Yeah, I think on a dollar basis. So -- so one  
2 of the things going on there is that the -- you know, at  
3 least part of the DA/RT adjustment is going in and  
4 reducing the -- the dollars, even though it's related sort  
5 of to both sales and purchases.

6                       But I think it is actually a problem with the  
7 AURORA model where it's just -- it's -- it's not properly  
8 optimizing sales and purchases and resulting in really too  
9 high levels of -- of purchases.

10           Q       Well, and just to be clear, if, according to  
11 your testimony, PacifiCorp's modeling is skewed and  
12 inconsistent with historical actuals, yours is even more  
13 skewed and even more inconsistent, isn't it? Because it  
14 has even higher, over a billion dollars, in net -- in  
15 purchases in your forecast.

16           A       Yeah, I think I'd have to -- I'd have to take a  
17 closer look at what's -- what's causing that. I  
18 hadn't -- hadn't noticed that until -- until you pointed  
19 it out.

20           Q       Okay. Now, if you could also refer to  
21 PacifiCorp/800, that's Mr. Mitchell's surrebuttal  
22 testimony.

23           A       Okay.

24           Q       Page 29. And I'm going to ask you a question  
25 about a confidential figure. I don't -- if we need to go

1 into a confidential session to answer this, we can  
2 disregard the question, but I'm hoping I can ask you a  
3 question that doesn't require you to divulge a  
4 specifically confidential figure.

5           So, again, keeping in mind your modeling results  
6 show short-term purchases of over a billion dollars. And  
7 if you look at confidential figure DA/RT 1, the left-hand  
8 column -- or the left-hand bar graph shows "Historical  
9 actual short term purchase dollars." And you would agree  
10 that your results are more than 200 percent higher than  
11 the highest result in 2022 and far exceed any level of  
12 historical purchase rates.

13           A     Yeah, so I actually don't have the -- the  
14 confidential version, but I think it's something that I  
15 would have to -- have to look at. I think there may  
16 be -- may be something going on in my particular  
17 spreadsheet but would be something I -- I need to look at.

18           Q     Okay. Well, let's also turn to AWEC/202. And  
19 this is the exhibit you prepared that shows the actual  
20 results from 2022 that you use as a comparator at several  
21 points in your testimony.

22                     And again, if we could turn to page 4.

23                     Then just let me know when you're there.

24           A     Okay.

25           Q     And that shows for 2022 actuals short-term firm

1 purchases of a little over \$407 million. Do you see that?

2 A Yeah.

3 Q And so again, your level of sales in your model  
4 is actually more than double that, correct?

5 A Yeah, I think that's fair enough. But I -- but  
6 I think one of the things that at least when I -- when  
7 I -- what I focus on when I look at the modeling is sort  
8 of the net figure of sales and purchases. So, you know,  
9 there's a lot of models that, you know, buy and sell, but  
10 a lot of those end up being just -- just offsetting at  
11 least in terms of dollars.

12 But -- but, like I said, I think that's  
13 something I'd have to look at more closely.

14 Q All right. Well, let's -- let's look at the  
15 sales levels you just mentioned. So if I could turn you  
16 back to AWEC/201, which is, again, your proposed NPC  
17 forecast.

18 And if you look at page 1, right at the second  
19 line from the bottom, it has "Total System Balancing  
20 Sales," and you model a rounded figure of \$728 million.

21 A Okay.

22 Q And I'm sorry, I'm going to have you flip back  
23 to PacifiCorp/403, which is, again, Mr. Mitchell's reply  
24 update report, and look at page 1, and we'll just look at  
25 the same figure for the PacifiCorp forecast.

1           And let me know when you're there.

2           A     Okay.

3           Q     All right. So page 1, PacifiCorp's forecast has  
4 \$402 million in -- in -- in sales. So again, your sales  
5 forecast is nearly twice as high as PacifiCorp's in your  
6 model. Is that correct?

7           A     Yeah, I -- I think what's going on in mine is  
8 the -- something with the -- with the DA/RT adjustment.  
9 So where the offsetting values -- when I deleted the  
10 offsetting volumes, the -- the offsetting dollars didn't  
11 get captured right, and so they got blown up. And so  
12 overall, it didn't impact the study, but I'm thinking  
13 that's what happened in my -- in my study, and I could  
14 confirm that later.

15                     But -- but I think overall, you know,  
16 what -- what I'm proposing with the DA/RT adjustment and  
17 whatever these, you know, sales end up -- end up being,  
18 you know, between all of the -- the studies is  
19 just -- just tie it to the historical average. So I think  
20 there -- there may be an issue with, with how that  
21 got -- how that flowed through in my model. But at the  
22 end of the day, all we're -- all -- you know, our  
23 recommendation is just tie it to the average, and you  
24 don't have to deal with these, you know, the -- the issues  
25 of the, you know, sales and -- and purchases and the

1 levels and things like that by, you know, just -- just  
2 using what it is.

3 Q Well, and -- and just to be clear, though, your  
4 recommendation is based on the modeling results that we're  
5 describing that, if I'm understanding correctly, you're  
6 admitting are erroneous or unreliable. Is that correct?

7 A No, no, I think what -- well, I actually don't  
8 know. So I need to go back and double-check. But -- but  
9 I think what happened is some extra sales and offsetting  
10 sales and purchases got mixed into my model. And so I  
11 think that's something that I would need to look at.

12 But at the end of the day, what we did was just  
13 tied it to the historical -- the historical levels. So,  
14 you know, that was -- that was the intention of what  
15 we -- of what our -- what our recommendation is.

16 And, of course, you know, PacifiCorp will do a  
17 final study at the, you know, end of this case anyway to  
18 kind of true all that up. So --

19 Q Okay. Well, let's -- let's look at the  
20 historical actual. So let's refer back to AWEC/202,  
21 please, and page 1. And so this is the 2022 actual data,  
22 and it shows total sales -- short-term firm sales at \$272  
23 million. Do you see that?

24 A Yeah.

25 Q And so isn't it true then that in your modeling

1 by increasing the market caps and removing them from Four  
2 Corners, Mid-C, and Palo Verde, you created a forecast  
3 that has nearly tripled the level of sales relative to  
4 2022.

5 A Well, but, you know, market prices have gone up  
6 by about that as well. Right? So, I mean, that's going  
7 to be the biggest -- biggest driver of that is, you know,  
8 market prices are -- are, you know --

9 Q Well, let's ask about that. So if you could  
10 turn to --

11 A -- (indiscernible).

12 Q -- page 7 of AWEC --

13 A Never mind. Strike that. Strike that. That's  
14 not right.

15 Q Yeah, I was going to say because you actually  
16 testify the market prices are lower now than they were in  
17 2022; isn't that correct?

18 A That's right. That's right. Strike that.

19 Q Okay. Now, let me ask you a question about  
20 market caps. So if I could direct your attention to your  
21 rebuttal testimony, AWEC/200, at page 2.

22 A Okay.

23 Q And I'd like to ask you a question about Table  
24 1, which is your forecast. You know, first of all, at the  
25 very top, it says "RMP July Update NPC Forecast,"

1 and -- and just to be clear, I think that's leftover  
2 language from testimony you filed in Wyoming. This is  
3 obviously not an RMP case, and it's not a July update.  
4 Isn't that correct?

5 A So, yep, that's -- that's a typo. So thanks.

6 Q Okay. And then on line 6, where you're  
7 describing your market cap recommendation, it says 95th  
8 percentile, and that's not, in fact, your recommendation  
9 in this case, is it?

10 A Oh, in the table. Yep, that's right. That's  
11 a -- it should be the 75th. Should say 75th.

12 Q And -- and down on line 11 on that same page  
13 where you describe your recommendation, you say it should  
14 "be modeled consistent with the Commission's decision  
15 Docket No. UE 390, the 2022 TAM." You see that?

16 A Yeah.

17 Q And -- and just to be clear, when the Commission  
18 approved that use of the 3rd quartile of averages, it was  
19 on a non-precedential basis. Isn't that correct?

20 A Yeah, I'd have to have to look at the order,  
21 but, you know, you can -- you can always make changes or,  
22 you know, propose changes after -- after an order. So --

23 Q Okay. Of course. Well, let's -- let's turn  
24 back -- and I apologize for making you jump around. Let's  
25 look at your opening testimonies. That's AWEC/100 at



1 page 6.

2 Let me know when you're there.

3 A All right.

4 Q And on line 16, you're describing why using the  
5 70th -- 75th percentile is your recommendation. And you  
6 testify that:

7 "Using an average to set a maximum level of  
8 sales has the inherent result of producing sales  
9 value that is less than the historical average."

10 Do you see that testimony?

11 A Yep.

12 Q And then you say in the next sentence, "That  
13 is," and I quote, "the main problem with PacifiCorp's"  
14 recommendation in this case. Do you see that?

15 A Yeah.

16 Q And -- and that's why then, on line 18, you  
17 recommend using the -- or you testify, excuse me, that the  
18 Commission recognized that fact when it approved using the  
19 3rd quartile approach. Do you see that?

20 A Yeah.

21 Q Okay. I'd like to direct your attention to  
22 PacifiCorp/1300, which is the order that the Commission  
23 issued in the 2022 TAM. So just for context, this is  
24 order number 21-379 from Docket UE 390. And just let me  
25 know when you're there. I'd like to direct your attention

1 to page 27 and 28.

2 A Apologies, what's the number again?

3 Q It's Exhibit -- PacifiCorp/1300.

4 A Okay.

5 Q And thankfully, the page in the original and the  
6 page in the exhibit are the same on this one. Apologize  
7 for the confusion earlier.

8 A Okay. What was the -- what was the page number?

9 Q Page 27.

10 A Okay.

11 Q And if we look at the -- the second paragraph,  
12 excuse me, the second sentence in the bottom paragraph, it  
13 says:

14 "PacifiCorp's table comparing its overall  
15 annual forecast of sales volume compared to  
16 actual sales volume shows that overall actual  
17 sales are approximately 6 million dollars,  
18 excuse me, 6 million megawatt hours per year for  
19 the last four years."

20 And in that case, those four years were 2017 to  
21 2020. Do you see that?

22 A Okay.

23 Q Okay. So I just want to keep that in mind, the  
24 \$6 million (sic). Now, if we turn to the very next page,  
25 page 28, at the very top, it shows that in PacifiCorp's

1 case, using the average of averages resulted in -- and  
2 this is a number from that table -- nearly 7 million -- 7  
3 million megawatt hours. That's 6,693,996. You see that  
4 number?

5 A I don't see that number.

6 Q So we're on page 28. There's a table at the  
7 top. It's in the "Forecast" column. It's the second  
8 number from the bottom.

9 A Okay.

10 Q And that's the calculation of forecasted sales  
11 using the average of averages approach. And it's rounded  
12 to 7 million megawatt hours.

13 A Okay.

14 Q And on the previous page, the Commission found  
15 that the historical average was right around 6 million.

16 A Okay.

17 Q So isn't it true that you're wrong when you  
18 claim that the main problem with the average  
19 of -- averages is that it will inherently produce sales  
20 volumes that are less than the historical average?  
21 Because in this case, the forecasted sales are higher than  
22 the historical average.

23 A No, that's not right.

24 Q Well, that's the data the Commission relied on.  
25 Isn't that correct?

1           A       Well, this -- these sales here would include,  
2 like, the DA/RT adjustment, for -- for example, and  
3 other -- other adjustments, so, you know, using -- if you  
4 use -- I mean, it's -- if you set a maximum in a  
5 value -- in a -- in a model and say it's 100 and  
6 that's -- you're -- you -- you want that to be the -- the  
7 average value, the -- the model has to select up to 100 in  
8 every single hour in order to -- for it to be that average  
9 value. But the model doesn't do that because sometimes  
10 it's lower, sometimes it's -- sometimes it hits the cap,  
11 sometimes it doesn't. So because it's not always up at  
12 that cap level, it's always going to be -- going to be  
13 lower -- lower than the cap.

14                   And, of course, there's -- there are other, you  
15 know, modeling adjustments that are done after market caps  
16 to -- to actually increase sales that actually don't agree  
17 with, but, you know, but, you know, mathematically,  
18 it's -- it's -- it's just not possible.

19           Q       Well, this data shows you're wrong, though;  
20 isn't that correct? And isn't that because those caps are  
21 set using bookouts, which are not included in the actual  
22 historical sales data?

23           A       No, I don't think it -- I don't think it  
24 shows -- shows that I'm wrong. I mean, the -- the -- the  
25 map kind of speaks for itself there. You know, the fact

1 that there are additional volumes at an outside of grid, I  
2 don't think it makes the conclusion that I have the  
3 testimony wrong, that, you know, setting a -- using a  
4 maximum to set an average is not -- not accurate.

5 Q All right. Let's turn to your rebuttal  
6 testimony, AWEC 200, page 4.

7 A Okay.

8 Q Now, I'd like to ask you about the question and  
9 answer that begins on line 17, where you're discussing the  
10 fact that PacifiCorp has historically under-forecast its  
11 net power costs in the TAM. And on line 17, you testify,  
12 "What is driving the recent NPC variances?" And you  
13 state, "Market conditions in late 2022 and early 2023 were  
14 extraordinary."

15 Do you see that?

16 A I do.

17 Q Now, if I could direct your attention to  
18 PacifiCorp 1302, and this is again testimony from Docket  
19 UE 390, which was the last litigated TAM.

20 A Okay.

21 Q Let me know when you're there. And if I --

22 A I'm there.

23 Q -- direct your attention to page 3 of the  
24 original. So it's page 5 of the exhibit.

25 And on line 16, in that case, you're testifying

1 again that you disagree that PacifiCorp is persistently  
2 under-forecasting NPC.

3 And beginning on line 21, you testify, excuse  
4 me, on the next page, page 4, beginning on line 5, you  
5 testify that:

6 "The GRID model is designed to produce a  
7 normalized forecast, which does not include the  
8 extraordinary events that have taken place in  
9 recent years."

10 And then you point to 2018, '19, and '20 as also  
11 being extraordinary years. So if we just put this  
12 together with the testimony in this case, of the last five  
13 years, four of them have been extraordinary years that  
14 don't show that there's an under-forecasting problem,  
15 correct?

16 A (No audible response.)

17 Q And the one year that, by your own admission, is  
18 normal was 2021. Is that correct?

19 A I guess there's a couple -- couple questions  
20 there. Not sure which one to answer.

21 Q Well, is it your testimony that of the last five  
22 years, there has been only one normal year, 2021?

23 A Well, in the past five years, there have been  
24 some extraordinary circumstances, you know, the pipeline  
25 rupture with -- with Enbridge; the -- what is it? -- the

1 Texas energy crisis; and then, you know, recently, kind of  
2 elevated prices last year and -- and kind of the -- just  
3 market prices that went through the roof.

4           And, you know, at the (indiscernible) part of  
5 this year. And -- and I guess the point is that, you  
6 know, we -- we -- we forecast market prices, right?  
7 They're -- they're put into the -- into the model, and  
8 they're -- they're put in at what the forward -- forward  
9 market prices are at the time. And sometimes they're  
10 lower. Sometimes they're higher. And maybe they don't  
11 pick up on, you know, some of these, you know,  
12 extraordinary events, but, you know, they -- they are, you  
13 know, the prices that if you went out today, you could buy  
14 power next year at.

15           And so, you know, if -- if -- if  
16 there's -- there's an issue with -- with the -- the market  
17 prices, that's -- that's just in the market price  
18 forecast. It's not -- not necessarily, you know, a  
19 modeling -- a modeling issue. And so I think that's the  
20 point of this testimony and the -- the testimony in this  
21 case.

22           Q     Well, and just to be clear, that 2021 was the  
23 one year in the last two litigated TAMs that you did not  
24 describe as extraordinary. And isn't it true that  
25 according to the company's analysis, they under-forecast

1 NPC by 21 percent in that year?

2 A I -- I don't know. I don't know. But -- but I  
3 think the -- the point I was making is that the, you know,  
4 you know, it's -- it's based on normalized or, you know,  
5 forward-looking market prices. And so, you know, if you  
6 take those as a given that it, you know, that it is, you  
7 know, you know, you can't -- you can't take these -- these  
8 events sort of out of -- out of that context.

9 Q But if every year has the same type of  
10 extraordinary event, it's at some point no longer  
11 extraordinary. Isn't that correct?

12 A You know, not necessarily. I mean, you know,  
13 certainly, the second half of this year has been -- has  
14 turned out to be better than expected. So, you know,  
15 things go through phases. Sometimes it's -- it's  
16 turbulent, and sometimes it's not.

17 I mean, I think, you know, ten years ago, eight  
18 years ago, market prices were pretty low. They stayed low  
19 for a long time. So I don't think so.

20 Q All right. Well, let me -- let me just direct  
21 your attention -- I want to keep that in mind that seven  
22 or eight years ago, market prices were normal. So if you  
23 could look at PAC/1306, this was testimony that you filed  
24 in Docket UE 396, excuse me, 296, which was the 2016 TAM.

25 A It was a long time ago.



1 Q It was a long time ago. We were much younger  
2 then. Less gray hair on my end anyway.

3 And if I could just turn your attention to page  
4 9 of the original, which is 10 of the exhibit.

5 And there --

6 A Okay. So I'm at 1306, page 10.

7 Q Correct. Page 9 of the -- yeah, page 9 of the  
8 original, 10 of the exhibit.

9 A Okay.

10 Q At the very top, you're testifying about "Why  
11 has the company's actual NPC been higher than normalized  
12 NPC?" And again, you describe abnormal years in 2013 and  
13 '14, correct?

14 A Yep.

15 Q So collectively, then, if you add that back in  
16 with the testimony more recently, over the last 11 years,  
17 7 of them have been abnormal or extraordinary, and that  
18 explains the consistent and persistent under-forecasting  
19 according to your testimony?

20 A I -- I don't know if I could remember very well  
21 back that far, but I mean, you certainly could  
22 characterize it that way if -- if you wanted to, but, you  
23 know, I -- I do think that, you know, what's -- what's  
24 happened in the past year is -- has been, you know, kind  
25 of on a different level.

1           You know, you -- the thing is with these markets  
2 is you never -- you never know what's -- what's going to  
3 happen with them. So --

4           Q     And just to be clear --

5           A     -- yeah, it has been extraordinary.

6           Q     Sorry, I didn't mean to interrupt. And just to  
7 be clear, when you describe 2022 as an extraordinary year,  
8 that's also the year you're comparing 2024 to, correct?

9 When you're saying net power costs in 2024 should be  
10 closer to 2022 despite the fact that was an extraordinary  
11 year.

12          A     Yeah, I mean, I think based on what we're seeing  
13 in markets now, I mean, probably lower, but, you know, I  
14 think it -- it is what it is.

15          Q     Okay. I just have a few more questions, Mr.  
16 Mullins. If you could turn back to your opening  
17 testimony, AWEC 100, at page 3, please.

18          A     All right. I think I am there.

19          Q     All right. And --

20          A     Okay.

21          Q     -- moving down to line 14, you're describing an  
22 adjustment that you made related to the model version of  
23 AURORA. And you testify on line 17 that "Energy Exemplar  
24 provides periodic updates to the AURORA model every few  
25 months." You see that?

1 A Yeah.

2 Q And then on the next line, you say, "These  
3 updates generally include changes and improvements to the  
4 modeling environment and the model's algorithms." Do you  
5 see that?

6 A Yep.

7 Q And in this testimony, you criticize the company  
8 for using an older version of AURORA than the one you  
9 used. Isn't that true?

10 A I don't think I -- I criticize them, so I don't  
11 think that's true.

12 Q Well, you recommend that the -- that the NPC  
13 update be based on the results of your calculations using  
14 a more updated version, which, according to your  
15 testimony, includes improvements. Isn't that true?

16 A So -- right. So I guess to -- to clarify,  
17 because I clarified this in my -- my rebuttal testimony,  
18 so, you know, when I was preparing this testimony and I  
19 was rerunning the model, I was coming up just with a  
20 lower -- lower value than -- than PacifiCorp was. And I  
21 wasn't sure what the -- the cause of it was.

22 And here I just attribute it -- attributed it to  
23 the -- the different model versions; however, in  
24 the -- the reply update PacifiCorp used an updated  
25 modeling version, and so I was able to confirm that it

1 wasn't actually the -- it's not actually the model version  
2 that's causing the difference. It's just something about  
3 my computer versus their computer that's -- that's causing  
4 the difference.

5           And it's -- it's, you know, different computers  
6 have, you know, sort of different, you know, parameters  
7 and then different, like, rounding points and different,  
8 you know, ways of randomizing numbers, and I think in a  
9 big simulation, those -- those can add up.

10           And so -- and so yeah, so mine still resulted in  
11 a lower -- lower value. So I included that in my  
12 recommendation.

13           Q     And -- and just to be clear, PacifiCorp updated  
14 the version they were using in their reply update. You  
15 did not update yours. So now you are using an older  
16 version that, by your own testimony, lacks the  
17 improvements that are included in the version PacifiCorp  
18 is using. Isn't that correct?

19           A     Right, yeah, and I -- I didn't -- you know,  
20 I -- I confirmed it wasn't the model version that's  
21 causing the difference, right? So it was the -- just the  
22 computer it was being run on. So --

23           Q     Well, you --

24           A     But that's right. I -- I didn't update my -- my  
25 model version.

1 Q So when you were describing how AURORA updates  
2 the model and that update -- those updates include  
3 improvements, you -- are you testifying today you  
4 just -- you don't know what happens with AURORA? You're  
5 not familiar with how that model gets updated and changed.

6 A Well, I think that's kind of a rude way to put  
7 it, but no, I wouldn't testify that way.

8 Q But your testimony originally is  
9 incorrect -- I'm trying to understand exactly why -- if  
10 the testimony in your direct still stands or if you are  
11 changing it.

12 A Yeah, I think I'd take a look at my rebuttal  
13 testimony and maybe find it.

14 Right. So I talked about it on page, like, 41  
15 of my rebuttal. So I say I attributed this to the use of  
16 a different AURORA model version. And then PacifiCorp  
17 updated its AURORA model version in reply testimony, but  
18 the differences are still there.

19 So I -- my understanding now is that the  
20 difference or the difference is being driven by an  
21 architectural difference, so, you know, a difference in  
22 the type of computer. And so -- and the difference was  
23 smaller in my, you know, rebuttal testimony, but, you  
24 know, so -- so I -- I included the 500, you know, \$500,000  
25 difference in my recommendation because that's what my

1 computer calculated.

2 Q All right. Thank you, Mr. Mullins.

3 MR. LOWNEY: I have no further questions.

4 ALJ MAPES: Thank you, Mr. Lowney, Mr.

5 Mullins.

6 Mr. Coleman, do you have any redirect?

7 MR. COLEMAN: So a pause to see if there's  
8 any or any questions from -- from yourself or  
9 Commissioner.

10 ALJ MAPES: There are not.

11 MR. COLEMAN: Can you bear with me just one  
12 second to take a quick look at my notes?

13 ALJ MAPES: Absolutely.

14 (Pause)

15 MR. COLEMAN: Your Honor, I think in the  
16 interest of time and the scope of the case and its  
17 procedural posture, I don't have anything to redirect.

18 ALJ MAPES: Okay. Well, thank you, Mr.  
19 Mullins. You're excused.

20 THE WITNESS: All right. Thank you.

21 ALJ MAPES: So those are the witnesses we  
22 have scheduled for today. Tomorrow, we will resume in  
23 confidential session.

24 Actually, let me check on that. Mr.  
25 Lowney, do you know if, given the settlement, your