

Lead Lag Study General Description

A lead lag study is a widely used and acceptable method for developing the Cash Working Capital (CWC) component of rate base in connection with the determination of revenue requirements in public utility rate case proceedings. The underlying objective is to measure the average length of time between the utility's provision of service and subsequent payment by customers (revenue lag), and between the incurrence of costs necessary for the provision of service and subsequent payment by the utility (expense lead). The measurement is in days. The lead lag study does not produce the computed cash working capital allowance. It provides the factors resulting from the revenue lag and various expense leads used in the Cost of Service Study model. Total cash working capital is the sum of the net working capital required or provided for each includible element of cost of service.

The expense factors are calculated with this formula.

$(\text{Composite Revenue Lag} - \text{Applicable Expense lead}) / 365 \text{ days} = \text{CWC factor}$

The CWC factor is applied to the appropriate test year expense amount. A positive result indicates a CWC requirement. A negative result indicates, on average, cash is received from customers before Public Service must pay the applicable expense. A negative result represents a non-investor source of capital. The CWC results of each appropriate expense are added together. This total CWC requirement is included in rate base. A positive CWC requirement is added to rate base. A negative CWC requirement is deducted from rate base.

To complete a lead lag study, a twelve-month period of time is used. Revenue receipts and payment disbursements are analyzed. The revenue receipts are gas sales. The payment disbursements are placed in categories such as natural gas for resale, labor, payroll taxes, O&M expenses, property tax, federal and state income taxes, sales tax paid and franchise fees paid.

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Revenue Lag - Gas

Public Service's customer base consists of rate groups ranging in size from one account to millions of accounts. Consequently, the rate groups were split into census and sample groups, depending on the rate class population. A census was conducted for all rate groups except the Commercial Small Gas (CSG) and Residential Gas (RG) groups. The average lag day for the sampled rate groups was estimated using a random sample for each rate class. The mean and standard deviation from the 2015 Public Service gas lag study (re-calculated for weighted payments) were used as a proxy to determine the sample size needed to achieve a 95% confidence that the mean lag day would be within $\pm 5\%$ of the estimated mean at the sample rate class level and a 99% confidence that the mean lag day across all rate classes would be within $\pm 5\%$ of the estimated mean (Table 1). Fifty percent of the calculated sample size was added to account for missing data and unknown differences between the 2015 and 2016 data. It is important to remember that these proxy variables were used to determine sample sizes only. Once actual values for the mean and variance were calculated from the new sample, they were used in all analysis.

PSC Rate Group	Number of Premises /Services	Sample or Census	Revenue	% of Total Revenue	2015 PSC Mean Lag Days	2015 PSC Variance of Lag Days	Cochran's Minimum	Calculated Sample Size	Sample Size with FPC *	Final Sample Size with 50% Alternates
CLG	6,085	Census	\$24,947,472.60	2.64%						
CSG	114,949	Sample	\$203,880,901.99	21.56%	38.138	278.926	6	295	294	441
IG	14	Census	\$1,419,824.95	0.15%						
RG	1,560,277	Sample	\$627,102,204.79	66.32%	31.613	228.018	736	351	351	1,104
TF	7,505	Census	\$75,326,976.09	7.97%						
TI	290	Census	\$12,840,037.80	1.36%						
TOTAL	1,689,120	Census	\$945,517,418.22	100.00%						

* FPC = Finite population correction factor

Total Debtor Sample & Census Counts =

15,439

Table 1. Sample Size

For the sample classes (CSG and RG), only accounts with 11 – 13 invoices were used in the analysis. One invoice per month was randomly selected if accounts had multiple invoices per month. For the census classes, all invoices were used in the analysis.

After the census and sample data was extracted, lag days were calculated for each invoice. Each payment or transaction date that was applied to an invoice was used in the calculation of lag days. The calculation for the revenue lag is:

$$\begin{aligned} \text{Service Period} &= \text{Invoice To Date} - \text{Invoice From Date} + 1 \\ \text{Midpoint Date} &= \text{Invoice From Date} + \text{Service Period} / 2 \\ \text{Lag Days} &= \text{Payment Date} - \text{Midpoint Date} + .5 \end{aligned}$$

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An average lag day value for each rate group was calculated and weighted with the percent of total revenue (Table 2). The sum of these weighted means equals the mean shown in Table 3. Standard deviation and confidence intervals were also calculated and are also shown in Table 3.

PSC Rate Group	Number of Premises /Services	Sample or Census	Revenue	% of Total Revenue	Average Lag Days	Weighted Average Lag Days	Number of Invoices	Std. Deviation	Variance	Weighted Variance
CSG	114,949	Sample *	\$203,880,901.99	21.56%	37.3600	8.0559	2,517	13.9217	193.8147	0.0035803
CLG	6,085	Census	\$24,947,472.60	2.64%	37.0365	0.9772	9,433	43.9641	1932.8417	0
IG	14	Census	\$1,419,824.95	0.15%	36.0289	0.0541	171	12.9784	168.4402	0
RG	1,560,277	Sample *	\$627,102,204.79	66.32%	31.8379	21.1161	8,857	18.1463	329.2891	0.0163542
TF	7,505	Census	\$75,326,976.09	7.97%	30.5589	2.4346	102,914	27.8180	773.8388	0
TI	290	Census	\$12,840,037.80	1.36%	29.6482	0.4026	2,565	38.5337	1484.8446	0
Total	1,689,120		\$945,517,418.22	100.00%		33.0405	126,457			0.0199344

* Sampled classes only include accounts with 11-13 invoices

Table 2. Statistics by Rate Class

Number of Invoices	Weighted Average Lag Days	Weighted Variance of Lag Days	95% Confidence Interval	95% Precision	99% Confidence Interval	99% Precision
126,457	33.040	0.01993445	0.27673123	0.837552%	0.36356272	1.100355%

Table 3. Statistics for Retail Gas

Expense Leads

The expense lead is the average time period from the receipt of goods or services by the utility to the date the utility pays for the goods and services. Expense lead is measured in days. Costs may be incurred over a period of time (i.e. month, year). The expense lead is measured from the midpoint of the service period to the date of payment. A separate expense lead is computed for each major category of operating expenses or account class (natural gas for resale, labor, payroll taxes, taxes, etc.). This expense lead is compared to the overall composite revenue lag to determine whether working capital is required from the company's investors (net revenue lag), or provided by the company's customers (net expense lead). Expenses leads are broken into a service period, midpoint date and lead days. The calculations for these are:

$$\begin{aligned}\text{Service Period} &= \text{To Service Date} - \text{From Service Date} + 1 \\ \text{Midpoint Date} &= \text{From Service Date} + \text{Service Period} / 2 \\ \text{Lead Days} &= \text{Payment Date} - \text{Midpoint Date} + .5\end{aligned}$$

The "From Service Date" is the first day goods or services were received. The "To Service Date" is the last day goods or services were received. If goods or services were received on just one day, the "From Service Date" and the "To Service Date" are the same. For those expense account classes with invoices, the invoices were reviewed for service date information. If no information about the service dates was available, the invoice date was used. After service dates were determined, the lead day values are calculated. The expense lead day value is measured from the midpoint of the dates the service was received to the date the cash was disbursed.

Expense leads are calculated using statistical samples for some expense categories, while other expense categories have statutory payment dates that are strictly adhered to for payment. The expense categories where statistical sampling was done are those with invoices generated from vendors, including natural gas for resale and operations & maintenance expenses.

For those expense categories where statistical sampling was done, the sample population had to be determined. Appropriate general ledger accounts for each expense category are reviewed to obtain the accounts payable records population. Only records that were actually paid can be used for the expense lead. A transaction was included if it was expensed to an account included in the expense category during the test period and paid. Once the population is determined, the population is reviewed to determine if the entire population ("census group") or a statistical sample will determine the expense lead. Once records are selected for the census group or sample, invoices are viewed to determine dates the goods and/or services were received. Payment dates are

generally included in the record. Once all service dates are determined and midpoint dates and lead days are calculated, the sample is ready for the overall expense lead mean to be determined.

Gas for Resale and Operations & Maintenance

Natural Gas for Resale

Natural gas for resale purchases are invoiced monthly. Invoices are for the prior month. Natural gas for resale is purchased from many vendors. Since there were many records in this account class, a statistical sample was selected to calculate the lead day analysis.

Other Non-Labor Operations & Maintenance Expense

Other non-fuel operations and maintenance (O&M) expense encompasses the non-labor O&M expense for production, transmission, distribution, customer operations and administrative and general expenses. This category has a large volume of transactions. As a result, a statistical sample was selected to calculate the lead day analysis.

Expense Sample Results

In order to estimate the average expense lead days for Public Service, Natural Gas for Resale and Non-Labor O&M expenses were separated by account class. A random sample was used to estimate the average lead time for the expenses from these classes.

For all account classes, the expenses were grouped together by payment reference number, which combined those expenses that were paid together into payment groups. Each population was split into two strata, with the largest expense payments in each population included in the first stratum and the remaining expense payments in the second stratum. All elements in the first stratum were included in the sample, to reduce the uncertainty of the overall estimate. Since the second group contained records that varied widely in size (dollars), the company used random sampling with the probability proportional to size, known as "pps sampling". Random pps sampling, with replacement, gives an unbiased estimate of the mean.

The sample described above, including the stratification scheme and the associated sample sizes, was designed to achieve a 90% confidence interval that was approximately 10% of the mean lead day value. For both the Gas for Resale and the O&M classes, the means and the variances from the previous 2015 PSCo Gas Lead Study (re-calculated for weighted payments) were used as a proxy to determine sample sizes. A minimum of 30 sample points was required and at least twenty percent of the calculated sample size of the second stratum

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was added to account for missing data and unknown differences between the previous studies' data and the current 2016 study data (Table 4). It is important to remember that the estimates were used for planning purposes only. Once actual values for the mean and variance were calculated from the new sample, they were used in all analysis.

Expense Category	Previous Study's Mean Lead Days (1)	Previous Study's Variance Lead Days (1)	2016 Study Census Stratum 1 Size	Stratum 1 Percent of Expense Category	2016 Study Sample Stratum 2 Size	2016 Study Sample Stratum 2 with 20% Alternates	2016 Study Total Census and Sample
Gas for Resale	40.114	2.156	52	75.31%	30	50 *	102
O&M	38.243	1125.885	525	50.00%	53	200 **	725

* This sample was increased from 30 to 50 to insure that the needed precision level was met.

** This sample was increased from 53 to 200 to insure that the needed precision level was met.

(1) Both Gas for Resale and O&M were based on the 2015 PSCo Gas Lead Study with a test year period of 12 months ended September 30, 2015.

Table 4. Sample Size

Once the payment date, payment due date, and service dates were determined for all available expense items, lead day values were calculated for each payment and a weighted lead day value was calculated for each payment reference number. A mean and variance were calculated by stratum and then a weighted mean and the associated stratified variance were calculated for the entire account class. The variance of this estimator was also calculated, which was then used to calculate a 90% confidence interval and a 95% confidence interval for the account class mean (Table 5).

Expense Category	Record Count	Weighted Average Lead	Weighted Variance	90% Confidence Interval	90% Precision	95% Confidence Interval	95% Precision
Gas for Resale	102	39.83	0.0019	0.071	0.179%	0.085	0.213%
O&M	725	34.47	1.886	2.259	6.555%	2.692	7.810%

Table 5. Statistics by Account Class

Labor

Payroll expenses are separated into two groups, Regular Payroll and Incentive Compensation. Employer taxes are discussed in the Taxes section of this study.

Regular Payroll

There are two types of payrolls at Public Service: Semi-monthly and Bi-weekly. Semi-monthly payrolls are paid twice a month. The first pay period covers the first through the fifteenth of the month with the pay date on the fifteenth or the prior business day. The second pay period of the month covers the sixteenth through the end of the month with the pay date on the last business day of the month. Bi-weekly payrolls run from Monday through Sunday with a pay date the following Friday or prior business day. Employees are paid either by a direct deposit to their bank or by a check mailed to their home. Checks are mailed so that receipt is on or before the pay date.

For net pay, the expense lead period is measured from the midpoint of the payroll period to the paycheck/pay advice issue date for net pay. For payroll deductions, the expense lead period is measured from the midpoint of the payroll period to the date funds are remitted to the vendor.

To determine the average expense leads for each of the payrolls, payroll reports showing the breakdown of gross payroll by withholding tax (FICA Withheld, Federal Income Tax Withheld, State Income Tax Withheld) or employee deduction (Union Dues, 401k deductions and Other Deductions) were obtained. This payroll information was summarized by type of payroll by pay period. The summary dollar information was used to dollar-weight the components of gross pay (net pay, taxes withheld, other employee deductions) in the calculations of average expense lead of each component.

Next, an average expense lead for each gross pay component was computed. The lead for net pay and each of the various withholdings was computed for each of the two payroll types. For net pay, the actual payroll check date was used to calculate the expense lead. For tax withholdings, the actual payment dates that correspond with the dates required by the IRS or state statute were used to calculate the expense lead. Other Employee Deductions were summarized by type of payroll by pay period. Deductions having the same payment date were grouped together. Then the scheduled payment date was used to calculate the expense lead of that group. Once expense leads for all the groups were determined, the average Other Employee Deductions expense lead was determined by dollar-weighting the various group expense leads. Other Employee Deductions are a component for Regular Payroll.

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Incentive Compensation

Incentive compensation is processed similarly to Regular Payroll. Separate payrolls, Semi-monthly and Bi-weekly, are run for incentive compensation. The Other Employee Deductions and tax withholdings are summarized. They are treated similar to the Regular Payroll. The Incentive Compensation was dollar weighted by its components.

Xcel Energy Services Company

Expenses billed to the Company by Xcel Energy Services Company are for the prior month and paid the 23rd or previous business day.

Vacation Pay/Paid Time Off

Employee vacation pay lead calculates the lag in time between when vacation pay is earned and when it is actually paid to employees.

Tax Expense Leads

The average expense leads computed for the various tax categories are based on actual amounts paid during the test year and the payment dates presently required by statute.

Property Taxes

Statutory payment dates are used to determine the property tax lead days.

Employer Payroll Taxes

FICA matching, city occupational taxes and employer unemployment taxes are included in this section. The Employer FICA Tax expense lead is the same as the FICA tax withheld expense lead in the payroll expense lead. The statutory payment dates for the taxes are used to calculate the city occupational and unemployment tax expense lead days.

Sales and Use Taxes

The Company pays both sales and use taxes. Sales tax occurs in two instances. The first instance occurs when the Company bills customers for sales tax in connection with sales of taxable goods and services. This type of sales tax is not an expense to the Company. The Company is the collection agent and remits the sales tax to Colorado. The second instance of sales tax occurs when the Company makes purchases of taxable goods and services from vendors that are required to charge the tax and remit it to Colorado's Department of Revenue. The tax paid in this instance is considered an expense to the Company.

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The use tax is a complement of the sales tax and designed to level the playing field for companies that are required to collect the sales tax. It typically occurs in a situation where a taxable purchase is made by the Company from a vendor that is not required to collect a sales tax, usually because the vendor lacks a physical presence (nexus) in the taxing jurisdiction. Here, the Company must self-assess and pay the use tax directly to Colorado's Department of Revenue. Use tax is an expense to the Company.

Sales tax and use tax are remitted together. Colorado taxes are due the 20th of the following month with funds withdrawn on the 21st or following business day. The statutory payment dates were used in the calculation of the sales tax expense lead.

The Boulder Cap Tax is included with sales and use tax. It is due on the last day of the following month or next business day.

Franchise Fees Paid

City franchise fees are charges by cities for the right to use city streets. Franchise fees are remitted on or before the statutory payment dates. The fees paid are not an expense to the Company. The fees are passed through to customers.

Federal and State Income Taxes

The expense leads computed for Federal and State Income Taxes reflect statutory payment dates and required minimum estimate payment levels. Required minimum estimated payments during the tax year are 100% for Federal and Colorado.

Public Service Company of Colorado
Gas for Resale Census Results
12 Months Ended September 30, 2016

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Line No.	Stratum	Count of PayRef	Stratum Population	Average Lead	Variance Lead	Weight	Weighted Average Lead	Weighted Variance of Lead	Finite Population Correction Factor	Variance of Estimate	90% Confidence Interval	90% Precision	95% Confidence Interval	95% Precision	
Gas for Resale	1	52	52	39.808	2.766	75.314%	29.981	0.030	0.000	0.000					
Gas for Resale	2	50	201	39.880	2.047	24.686%	9.845	0.002	0.751	0.002					
Total		102	253			100%	39.826			0.002	0.071	0.179%	0.085	0.213%	
Rounded weighted average lead days							39.83								

Public Service Company of Colorado
Lead Lag Study - Payroll Lead
12 Months Ended September 30, 2016

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Line Number	Description	Dollar Amount \$	Lead Days	Dollar Days \$
1	Regular Payroll			
2	Net Payroll	164,919,734.08	10.51	1,733,475,912.10
3	FICA & Medicare Withheld	19,167,505.79	13.10	251,025,408.32
4	Federal Income Tax Withheld	36,344,691.32	13.16	478,338,540.87
5	State Income Tax Withheld - Colorado	9,300,071.00	15.79	146,832,493.00
6	State Income Tax Withheld - Minnesota	394.47	44.37	17,500.91
7	State Income Tax Withheld - New Mexico	660.95	48.00	31,727.23
8	City Occupational Tax	47,298.00	58.74	2,778,072.95
9	Employee Deductions	44,745,151.19	14.38	643,283,655.31
10				
11	Total Gross Pay	274,525,506.80		3,255,783,310.69
12	Average Lead		11.86	
13				
14				
15	Incentive Payroll			
16	Net Payroll	3,501,347.67	252.08	882,623,265.75
17	FICA & Medicare Withheld	465,287.28	253.53	117,966,485.98
18	Federal Income Tax Withheld	1,537,779.04	253.13	389,254,527.90
19	State Income Tax Withheld	278,229.34	256.33	71,317,590.55
20	City Occupational Tax	11.50	272.00	3,128.00
21	Employee Deductions	286,158.44	253.99	72,681,825.65
22				
23	Total Gross Pay	6,068,813.27		1,533,846,823.83
24	Average Lead		252.74	

Public Service Company of Colorado
Operations and Maintenance Sample Results
12 Months Ended September 30, 2016

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Line No.	Stratum	Count of PayRef	Stratum Population	Average Lead	Variance Lead	Weight	Weighted Average Lead	Weighted Variance of Lead	Finite Population Correction Factor	Variance of Estimate	90% Confidence Interval	90% Precision	95% Confidence Interval	95% Precision
O&M	1	525	525	32.010	6531.065	49.998%	16.004	3.110	0.000	0.000				
O&M	2	200	85453	36.920	1512.408	50.002%	18.461	1.891	0.998	1.886				
Total		725	85978			100%	34.465			1.886	2.259	6.555%	2.692	7.810%

Rounded weighted average lead days 34.47

Public Service Company of Colorado
Expense Lead - Public Service Company of Colorado payment to Xcel Energy Services Company
12 Months Ended September 30, 2016

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Line No.	Period Beginning	Period Ending	Days of Service	Midpoint Days	Midpoint Date	Payment Date	Lead Days
1	10/1/2015	10/31/2015	31.0	15.5	10/16/15 12:00	11/23/2015	38.0
2	11/1/2015	11/30/2015	30.0	15.0	11/16/15 0:00	12/23/2015	37.5
3	12/1/2015	12/31/2015	31.0	15.5	12/16/15 12:00	1/22/2016	37.0
4	1/1/2016	1/31/2016	31.0	15.5	1/16/16 12:00	2/23/2016	38.0
5	2/1/2016	2/29/2016	29.0	14.5	2/15/16 12:00	3/23/2016	37.0
6	3/1/2016	3/31/2016	31.0	15.5	3/16/16 12:00	4/22/2016	37.0
7	4/1/2016	4/30/2016	30.0	15.0	4/16/16 0:00	5/23/2016	37.5
8	5/1/2016	5/31/2016	31.0	15.5	5/16/16 12:00	6/23/2016	38.0
9	6/1/2016	6/30/2016	30.0	15.0	6/16/16 0:00	7/22/2016	36.5
10	7/1/2016	7/31/2016	31.0	15.5	7/16/16 12:00	8/23/2016	38.0
11	8/1/2016	8/31/2016	31.0	15.5	8/16/16 12:00	9/23/2016	38.0
12	9/1/2016	9/30/2016	30.0	15.0	9/16/16 0:00	10/21/2016	35.5
13							
14	Average Lead Days						37.33

Public Service Company of Colorado
Lead Lag - Paid Time Off Pay
12 Months Ended September 30, 2016

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Line
No.

1	Paid time off pay accrued for 12 months ended Sept. 30, 2016		15,377,039
2			
3	Days in test year		366
4			
5	Paid time off pay per day		\$42,014
6			
7	Balances in Accrued Vacation Liability Account		
8	Sept. 30, 2015	\$15,048,462	
9	Sept. 30, 2016	\$15,176,142	\$15,112,302
10			
11			
12	Average lead paid time off days in accrued balance		359.70

Public Service Company of Colorado
Lead Lag - Colorado Property Tax
12 Months Ended September 30, 2016

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Line No.	Period Covered From	To	Days of Service	Midpoint Days	Midpoint Date	Payment Date	Lead Days	Portion of Annual Tax	Weighted Lead Days
1	1/1/2015	12/31/2015	365.0	182.5	7/2/15 12:00	4/29/2016	302.0	25.00%	75.50
2	1/1/2016	12/31/2016	366.0	183.0	7/2/16 0:00	4/28/2017	300.5	75.00%	225.38
3									
4									
5									
6									
7	Total Lead Days								300.88

Public Service Company of Colorado
Payroll Related Taxes
12 Months Ended September 30, 2016

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Line No.		Amount	Lead Days	Dollar Days
1	FICA - Company Match	19,617,501.57	18.72	367,142,290.40
2				
3	Occupational - Company Expense	33,150.00	58.91	1,952,934.00
4				
5	FUTA	117,575.20	100.22	11,783,186.13
6				
7	SUTA - Colorado	260,640.55	97.13	25,316,741.17
8				
9	SUTA - Texas	622.35	80.96	50,388.27
10				
11	Totals	20,029,489.67		406,245,539.97
12				
13	Average Lead Days		20.28	

Public Service Company of Colorado
Sales-Use-Boulder CAP Taxes Paid
12 Months Ended September 30, 2016

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Line No.	Period Beginning	Period Ending	Days of Service	Midpoint Days (1)	Midpoint Date	Payment Date	Lead Days	Amount \$	Dollar Days \$	
1	Sales and Use Tax									
2	10/1/2015	10/31/2015	31.0	15.5	10/16/15 12:00	11/20/2015	35.0	11,873,223.41	415,562,819.35	
3	11/1/2015	11/30/2015	30.0	15.0	11/16/15 0:00	12/21/2015	35.5	11,383,571.89	404,116,802.10	
4	12/1/2015	12/31/2015	31.0	15.5	12/16/15 12:00	1/20/2016	35.0	15,810,391.91	553,363,716.85	
5	1/1/2016	1/31/2016	31.0	15.5	1/16/16 12:00	2/22/2016	37.0	15,603,072.09	577,313,667.33	
6	2/1/2016	2/29/2016	29.0	14.5	2/15/16 12:00	3/21/2016	35.0	12,947,774.57	453,172,109.95	
7	3/1/2016	3/31/2016	31.0	15.5	3/16/16 12:00	4/20/2016	35.0	13,210,709.65	462,374,837.75	
8	4/1/2016	4/30/2016	30.0	15.0	4/16/16 0:00	5/20/2016	34.5	11,323,370.26	390,656,273.97	
9	5/1/2016	5/31/2016	31.0	15.5	5/16/16 12:00	6/20/2016	35.0	10,852,098.73	379,823,455.55	
10	6/1/2016	6/30/2016	30.0	15.0	6/16/16 0:00	7/20/2016	34.5	12,393,799.70	427,586,089.65	
11	7/1/2016	7/31/2016	31.0	15.5	7/16/16 12:00	8/22/2016	37.0	13,352,217.34	494,032,041.58	
12	8/1/2016	8/31/2016	31.0	15.5	8/16/16 12:00	9/20/2016	35.0	14,934,771.47	522,717,001.45	
13	9/1/2016	9/30/2016	30.0	15.0	9/16/16 0:00	10/20/2016	34.5	12,794,534.39	441,411,436.46	
14										
15	Total							35.29	156,479,535.41	5,522,130,251.99
16										
17	Boulder Cap Tax									
18	10/1/2015	10/31/2015	31.0	15.5	10/16/15 12:00	11/30/2015	45.0	152,804.88	6,876,219.60	
19	11/1/2015	11/30/2015	30.0	15.0	11/16/15 0:00	12/31/2015	45.5	128,184.57	5,832,397.94	
20	12/1/2015	12/31/2015	31.0	15.5	12/16/15 12:00	1/29/2016	44.0	162,953.28	7,169,944.32	
21	1/1/2016	1/31/2016	31.0	15.5	1/16/16 12:00	2/29/2016	44.0	185,063.31	8,142,785.64	
22	2/1/2016	2/29/2016	29.0	14.5	2/15/16 12:00	3/31/2016	45.0	161,049.24	7,247,215.80	
23	3/1/2016	3/31/2016	31.0	15.5	3/16/16 12:00	4/29/2016	44.0	146,307.03	6,437,509.32	
24	4/1/2016	4/30/2016	30.0	15.0	4/16/16 0:00	5/31/2016	45.5	138,258.33	6,290,754.02	
25	5/1/2016	5/31/2016	31.0	15.5	5/16/16 12:00	6/30/2016	45.0	133,431.09	6,004,399.05	
26	6/1/2016	6/30/2016	30.0	15.0	6/16/16 0:00	7/29/2016	43.5	138,190.44	6,011,284.14	
27	7/1/2016	7/31/2016	31.0	15.5	7/16/16 12:00	8/31/2016	46.0	165,864.14	7,629,750.44	
28	8/1/2016	8/31/2016	31.0	15.5	8/16/16 12:00	9/30/2016	45.0	178,457.86	8,030,603.70	
29	9/1/2016	9/30/2016	30.0	15.0	9/16/16 0:00	10/31/2016	45.5	149,764.70	6,814,293.85	
30										
31	Total							44.82	1,840,328.87	82,487,157.82
32										
33	Average Lead							35.40	158,319,864.28	5,604,617,409.81

Public Service Company of Colorado
Lead Lag - Federal Income Tax
12 Months Ended September 30, 2016

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Line No.	Period Covered		Days of Service	Midpoint Days	Midpoint Date	Payment Date	Lead Days	Portion of Annual Tax	Weighted Lead Days
	From	To							
1	1/1/2015	12/31/2015	365	182.5	7/2/15 12:00	12/15/2015	166.0	25.00%	41.50
2	1/1/2016	12/31/2016	366	183.0	7/2/16 0:00	4/15/2016	-77.5	25.00%	-19.38
3	1/1/2016	12/31/2016	366	183.0	7/2/16 0:00	6/15/2016	-16.5	25.00%	-4.13
4	1/1/2016	12/31/2016	366	183.0	7/2/16 0:00	9/15/2016	75.5	25.00%	18.88
5								100.00%	
6	Total Lead Days								36.87

Payments are made on the 15th day of the 4th, 6th, 9th, and 12th months of the tax year.
If any date falls on a Saturday, Sunday, or legal holiday, the installment is due on the next regular business day.

Public Service Company of Colorado
Lead Lag - Colorado Income Tax
12 Months Ended September 30, 2016

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Line No.	Period Covered		Days of Service	Midpoint Days	Midpoint Date	Payment Date	Lead Days	Portion of Annual Tax	Weighted Lead Days
	From	To							
1	1/1/2015	12/31/2015	365	182.5	7/2/15 12:00	12/15/2015	166.0	25.00%	41.50
2	1/1/2016	12/31/2016	366	183.0	7/2/16 0:00	4/15/2016	-77.5	25.00%	-19.38
3	1/1/2016	12/31/2016	366	183.0	7/2/16 0:00	6/15/2016	-16.5	25.00%	-4.13
4	1/1/2016	12/31/2016	366	183.0	7/2/16 0:00	9/15/2016	75.5	25.00%	18.88
5								100.00%	
6	Total Lead Days								36.87

Effective in 2006, it is corporate policy to pay all state estimated income tax payments in four installments. The installments follow the Federal estimated income tax payments. Payments are made on the 15th day of the 4th, 6th, 9th, and 12th months of the tax year. If any date falls on a Saturday, Sunday, or legal holiday, the installment is due on the next regular business day.

Public Service Company of Colorado
Gas Franchise Fees Paid
12 Months Ended September 30, 2016

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Line No.		Period Beginning	Period Ending	Days of Service	Midpoint Days	Midpoint Date	Payment Date	Lead Days	Amount	Dollar Days \$
1	Annual									
2	February	10/1/2015	9/30/2016	366.0	183	4/1/16 0:00	2/29/2016	-31.5	0.00	0.00
3										
4	Quarterly									
5	October - December	10/1/2015	12/31/2015	92.0	46	11/16/15 0:00	1/15/2016	60.5	99,908.81	6,044,483.01
6	October - December	10/1/2015	12/31/2015	92.0	46	11/16/15 0:00	1/29/2016	74.5	642.23	47,846.14
7	January - March	1/1/2016	3/31/2016	91.0	45.5	2/15/16 12:00	4/15/2016	60.0	156,334.49	9,380,069.40
8	January - March	1/1/2016	3/31/2016	91.0	45.5	2/15/16 12:00	4/29/2016	74.0	1,077.82	79,758.68
9	April - June	4/1/2016	6/30/2016	91.0	45.5	5/16/16 12:00	7/15/2016	60.0	78,630.15	4,717,809.00
10	April - June	4/1/2016	6/30/2016	91.0	45.5	5/16/16 12:00	7/29/2016	74.0	662.43	49,019.82
11	July - September	7/1/2016	9/30/2016	92.0	46	8/16/16 0:00	10/14/2016	59.5	53,757.81	3,198,589.70
12	July - September	7/1/2016	9/30/2016	92.0	46	8/16/16 0:00	10/31/2016	76.5	231.68	17,723.52
13										
14										
15	Monthly									
16	October	10/1/2015	10/31/2015	31.0	15.5	10/16/15 12:00	11/30/2015	45.0	986,874.47	44,409,351.15
17	November	11/1/2015	11/30/2015	30.0	15	11/16/15 0:00	12/31/2015	45.5	1,529,164.99	69,577,007.05
18	December	12/1/2015	12/31/2015	31.0	15.5	12/16/15 12:00	1/29/2016	44.0	3,027,291.28	133,200,816.32
19	January	1/1/2016	1/31/2016	31.0	15.5	1/16/16 12:00	2/29/2016	44.0	3,450,689.04	151,830,317.76
20	February	2/1/2016	2/29/2016	29.0	14.5	2/15/16 12:00	3/31/2016	45.0	2,654,309.41	119,443,923.45
21	March	3/1/2016	3/31/2016	31.0	15.5	3/16/16 12:00	4/29/2016	44.0	2,372,331.15	104,382,570.60
22	April	4/1/2016	4/30/2016	30.0	15	4/16/16 0:00	5/31/2016	45.5	1,832,994.23	83,401,237.47
23	May	5/1/2016	5/31/2016	31.0	15.5	5/16/16 12:00	6/30/2016	45.0	1,430,561.15	64,375,251.75
24	June	6/1/2016	6/30/2016	30.0	15	6/16/16 0:00	7/29/2016	43.5	1,085,745.47	47,229,927.95
25	July	7/1/2016	7/31/2016	31.0	15.5	7/16/16 12:00	8/31/2016	46.0	875,886.84	40,290,794.64
26	August	8/1/2016	8/31/2016	31.0	15.5	8/16/16 12:00	9/30/2016	45.0	969,975.52	43,648,898.40
27	September	9/1/2016	9/30/2016	30.0	15	9/16/16 0:00	10/31/2016	45.5	936,141.34	42,594,430.97
28										
29										
30	Totals								21,543,210.31	967,919,826.78
31										
32	Average Lead							44.93		

Xcel Energy Services
Summary of Lead Lag Factors
12 Months Ended September 30, 2016

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<u>Line No.</u>	<u>Description</u>	<u>Revenue Lag Days (a)</u>	<u>Expense Lead Days (b)</u>	<u>Net Lag Days</u>	<u>CWC Factor</u>
1	Labor	37.33	11.86	25.47	0.069781
2					
3	Other Operations & Maintenance	37.33	34.47	2.86	0.007836

(a) Revenue lag days are the days it takes Public Service Company of Colorado to pay Xcel Energy Services.

(b) Expense lead days are the same as those used by Public Service Company of Colorado.

Public Service Company of Colorado
Revenue Lag Results
12 Months Ended September 30, 2016

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Number of Invoices	Weighted Average Lag Days	Weighted Variance of Lag Days	95% Confidence Interval	95% Precision	99% Confidence Interval	99% Precision
126,457	33.040	0.019934448	0.276731232	0.837552%	0.363562716	1.100355%

Public Service Company of Colorado
Revenue Lag Results by Rate Group
12 Months Ended September 30, 2016

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PSC Rate Group	Number of Premises/Services	Sample or Census	Revenue	% of Total Revenue	Average Lag Days	Weighted Average Lag Days	Number of Invoices	Std. Deviation	Variance	Weighted Variance
CSG	114,949	Sample *	203,880,901.99	21.56%	37.3600	8.0559	2,517	13.9217	193.8147	0.0035803
CLG	6,085	Census	24,947,472.60	2.64%	37.0365	0.9772	9,433	43.9641	1932.8417	0
IG	14	Census	1,419,824.95	0.15%	36.0289	0.0541	171	12.9784	168.4402	0
RG	1,560,277	Sample *	627,102,204.79	66.32%	31.8379	21.1161	8,857	18.1463	329.2891	0.0163542
TF	7,505	Census	75,326,976.09	7.97%	30.5589	2.4346	102,914	27.8180	773.8388	0
TI	290	Census	12,840,037.80	1.36%	29.6482	0.4026	2,565	38.5337	1484.8446	0
Total	1,689,120		945,517,418.22	100.00%		33.0405	126,457			0.0199345

Rounded weighted average lead days 33.04

* Sampled classes only include accounts with 11-13 invoices