

## **COSA Report**

In order to prepare this COSA, we used the model provided and prepared by EES earlier in 2016 as the starting point. We updated the rates to reflect the current rate structure, as well as updated budgeted sales to reflect what sales have been year-to-date. We then passed the model back to Gail Tabone at EES for her review. Based on her review, Gail provided three recommendations, which are shown at the end of this report.

This report takes the report prepared by EES from the earlier COSA and updated information. Additionally, most of the graphs and some of the discussion were removed to make this report more brief. A full copy of the COSA is available for anyone who would want to review it.

## **Revenue Requirements Results**

A revenue requirement analysis compares the overall revenues of the utility to its expenses and helps determine the overall adjustment to rate levels that is required. For this analysis, a “cash basis” method was used for determining BEC’s revenue requirement. Annual operating expenses for calendar year (CY) 2016 were used to determine the revenue requirement and were based on the budget provided by BEC.

A base case was defined to develop the COSA. This base case assumed the following:

- Forecast calendar year 2016 was selected as the period for the allocation of costs within the cost of service study.
- Distribution plant was classified based both on a “minimum system” approach and a “100% demand” approach.
- Revenues are based on forecast loads and BEC’s current retail rates and differ slightly from the 2016 budget amounts as the calculations are more detailed.
- Capital improvement projects are fully funded from cash collected in rates.

Looking at the test period of CY 2016, revenues collected from current rates are expected to be (assuming that the rates were in place for the full year) \$8.9 million, while expenses are projected to be \$8.3 million. This results in a 6.8% percent surplus in retail rate revenues. A 5% rate decrease is being proposed for 2016 to provide some financial reserves and to reflect the uncertainty of costs in this transitional period under the new LVE management agreement. If surplus revenue is available during 2016, it can be used to fund capital improvements, pay off existing debt or provide an additional rate decrease in the following year.

## Cost of Service Study

A cost of service analysis (COSA) is concerned with the equitable allocation of the revenue requirement to the various customer classes of service. As is standard procedure for cost of service analyses, the revenue requirement for BEC was functionalized, classified and allocated. Unlike most cost of service studies, costs were kept functionalized throughout the analysis which provides for greater transparency when reviewing results.

A COSA study can be performed using embedded costs or marginal costs. Embedded costs generally reflect the actual costs incurred by the utility and closely track the costs kept in its accounting records. Marginal costs reflect the cost associated with adding a new customer, and are based on costs of facilities and services if incurred at the present time. This study uses an embedded COSA as its standard methodology.

Generally there are two methodologies that can be used to classify distribution costs: 100 percent demand and minimum system. The 100 percent demand methodology assumes that the distribution system is built to meet the non-coincident peak. Therefore, distribution costs using this method are classified as 100 percent demand related.

Under the minimum system approach, specific distribution costs are split between demand and customer. This approach reflects the philosophy that the system is in place in part because there are customers to serve throughout the service territory expanse, and that a minimally sized distribution system is needed to serve these customers even if they only use 1 kWh of energy per year. The concept follows that any costs associated with a system larger than this minimal size are due to the fact that customers “demand” a delivery quantity greater than the minimum unit of electricity and that therefore, those costs should be treated as demand related. Because the residential class tends to have a higher share of the number of customers as compared to the share of non-coincident peak, the minimum system methodology tends to allocate more costs to the residential class and customer charges tend to be higher than with the 100 percent demand methodology. Demand-vs-customer allocations for the minimum system case were derived using data from BEC and other Northwest public utilities.

Given a number of assumptions, the results show that using present rates, BEC would be over-collecting revenues to meet allocation year costs. When examining the results, it is important to note that the inter-class cost allocation is based on load data estimates and usage pattern assumptions. Therefore, deviations of less than 10 percent from the cost of service typically do not warrant interclass rate modifications.

## SUMMARY OF PRESENT AND PROPOSED RATE REVENUE

### BY CUSTOMER CLASS

#### Schedule 1.1

Forecast Year: 2016	Total	Residential	Small Commercial	Large Commercial	Industrial	Irrigation
<b>Revenues - Present Rate</b>	\$8,920,185	\$7,355,777	\$667,179	\$294,207	\$170,338	\$432,685
Less Allocated Revenue Requirement	\$8,311,432	\$6,913,886	\$534,405	\$242,030	\$159,285	\$461,826
Difference	\$608,753	\$441,891	\$132,774	\$52,177	\$11,053	-\$29,141
Revenue To Cost Ratio	107.3%	106.4%	124.8%	121.6%	106.9%	93.7%
Adjusted Revenue to Cost Ratio	100.0%	99.1%	116.3%	113.3%	99.6%	87.3%
<b>% Increase Total Revenue to Equal Allocated Cost</b>	<b>-6.79%</b>	<b>-5.98%</b>	<b>-19.80%</b>	<b>-17.63%</b>	<b>-6.45%</b>	<b>6.69%</b>
Rate Base	\$45,449,995	\$38,541,162	\$2,341,371	\$997,653	\$663,613	\$2,906,196
Rate Of Return, %	1.3%	1.1%	5.7%	5.2%	1.7%	-1.0%
Rate Of Return, \$	\$608,753	\$441,891	\$132,774	\$52,177	\$11,053	-\$29,141
<b>Unit Cost: Present Rates (\$/kWh)</b>	<b>\$0.1436</b>	<b>\$0.14769</b>	<b>\$0.129</b>	<b>\$0.115</b>	<b>\$0.103</b>	<b>\$0.146</b>
<b>Unit Cost Summary</b>						
<b>Unit Cost: Present Rates (\$/kWh)</b>	<b>\$0.144</b>	<b>\$0.1477</b>	<b>\$0.1290</b>	<b>\$0.115</b>	<b>\$0.103</b>	<b>\$0.146</b>
<b>Unit Cost: COSA Rates (\$/kWh)</b>	<b>\$0.134</b>	<b>\$0.139</b>	<b>\$0.103</b>	<b>\$0.095</b>	<b>\$0.096</b>	<b>\$0.156</b>

When looking at the revenue to cost ratios it is important to reflect the uncertainty inherent in any COSA due to methodology approaches and uncertainty in the load data used to allocate costs. For that reason a range of 90% to 110% is typically used to measure whether customer classes are paying an appropriate share of costs.

Based on the results under both methodologies, the residential class is near 100% and should receive the average 5% rate decrease. The small commercial class is paying above 110% and should receive a greater than average rate decrease if BEC wishes to make adjustments between classes. For the Large Commercial and Industrial classes, customers are paying too much under the minimum system approach and too little under the 100% demand approach. For that reason it is recommended that these two classes receive the average 5% rate decrease. Finally, the Irrigation class is underpaying in both cases and should receive less than the full 5% decrease if BEC wants to make interclass adjustments.

Note that these findings are similar to the results from the earlier 2016 COSA. The two exceptions are that the Industrial and Irrigation classes are paying an amount closer to their allocated costs than before.

For the Irrigation class, the COSA shows that they are still underpaying their cost of service. This is not an unexpected result due to the nature of the service. However, they are much closer than they have been in prior years. On the power supply side, the costs of purchased power do not differ based on season and so there is no benefit to Irrigators related to their summer usage. Power costs may have been more seasonal in the past, but BEC has changed its power supply source and rates are flat across all hours. Because they do not peak at the time of the annual peak for BEC they are not allocated any of the transmission-related costs, however, these costs are small for BEC.

The issue is with the distribution costs. Distribution facilities are designed based on the maximum peak load that the customer might have throughout the year. For this reason the distribution costs are allocated on the basis of the non-coincident peak. The Irrigators receive a full allocation based on their annual peak loads that occur in the summer months. Unlike other classes, these distribution costs must be spread out over a 4-5 month period rather than the full 12-month period used by other types of customers. For that reason the COSA results show that their demand-related costs are more than double those of the other classes.

However, the current rates for the Irrigation class have a demand charge that is the same as for the Large Commercial and Industrial classes and an energy rate that is lower than for all other classes. Because those rates do not line up with their costs, the results show that they are paying only 94% of their assigned costs. If the Irrigation class were to use electricity all year, their demand-related costs would be spread over a larger number of kW and the revenue to cost ratio would increase.

## Rate Design

Rate design encompasses a multitude of considerations that often are somewhat removed from fundamental unit cost determinations. Issues such as appropriate price signals, potential impact of rate adjustments, ability to pay, intra-class subsidies etc., will ultimately influence the final approved rate structure.

Output from the COSA analysis was designed to facilitate the development of rate designs. Unit cost determinations, by function, typically represent the starting point from which final rate design determinations can be developed.

There are several options for achieving the desired 5% overall rate decrease for the utility.

- Option 1:
  - 5% decrease for all customer classes
- Option 2:
  - 4.5% decrease for Residential, Large Commercial and Industrial
  - 15% decrease for Small Commercial Class
  - 0% decrease for Irrigation Class
- Option 3:
  - 5% decrease for Residential, Large Commercial and Industrial
  - 8% decrease for Small Commercial Class
  - 2% decrease for Irrigation Class

Option 2 provides the best reflection of the COSA results. The utility will need to balance the COSA results along with other issues to determine the appropriate level of rate decrease for each customer class. Once the rate decrease by class is determined, specific rate designs can be developed. The utility could apply the rate decrease equally to all of the rate components (i.e. customer charge, demand charge, energy charge) or reduce just the energy charge, as was done earlier in 2016.

## **Recommendations**

Based on the projected revenue requirement and COSA analysis, the following recommendations for BEC have been developed by EES Consulting:

- Using current rates, BEC is collecting more than sufficient revenues compared to projected CY 2016 costs.
- A decrease of 5% is recommended for 2016.
- The utility needs to select the appropriate rate decrease for each customer class.
- Specific changes to the rate components can then be set to collect the appropriate total for each class.

**Beartooth Electric Cooperative, Inc.**  
**Proposed Rate Structure**  
**Option 1**

**Current Rates**

	Avg Customers	kWh	Facility Charge	Demand Charge	Avg Demand	kWh Rate	Revenue	% Decrease	Revenue Decrease	Adjusted Revenues
Residential	5,517	49,805,897	33.50	-	5.10	0.103160	7,355,800	-5.0%	(367,790)	6,988,010
Irrigation	55	2,954,640	121.80	12.40	22.36	0.057036	431,900	-5.0%	(21,595)	410,305
Small Commercial	355	5,171,537	33.50	-	4.41	0.101408	667,100	-5.0%	(33,355)	633,745
Large Commercial	18	2,551,434	111.65	12.40	39.91	0.062778	291,200	-5.0%	(14,560)	276,640
Industrial	1	1,653,700	218.25	12.40	395.90	0.065797	170,300	-5.0%	(8,515)	161,785
Totals	<u>5,946</u>	<u>62,137,208</u>					8,916,300		(445,815)	8,470,485
Other revenues							44,800		-	44,800
Total revenues							<u>8,961,100</u>		<u>(445,815)</u>	<u>8,515,285</u>

**Proposed Rates**

	Avg Customers	kWh	Facility Charge	Demand Charge	Avg Demand	kWh Rate	Revenue	Decrease in kWh Charge	Decrease in Revenue
Residential	5,517	49,805,897	33.50	-	5.10	0.095775	6,988,010	7.2%	5.0%
Irrigation	55	2,954,640	121.80	12.40	22.36	0.049726	410,305	12.8%	5.0%
Small Commercial	355	5,171,537	33.50	-	4.41	0.094950	633,745	6.4%	5.0%
Large Commercial	18	2,551,434	111.65	12.40	39.91	0.057077	276,640	9.1%	5.0%
Industrial	1	1,653,700	218.25	12.40	395.90	0.060625	161,785	7.9%	5.0%
Totals	<u>5,946</u>	<u>62,137,208</u>					8,470,485		<u>5.0%</u>
Other revenues							44,800		
Total revenues							<u>8,515,285</u>		

**Effect**

"Average" Bill	Average kWh	Old	New	Difference	% Difference
Residential	752	111.11	105.55	5.56	5.0%
Irrigation	4,397	649.84	617.70	32.14	4.9%
Small Commercial	1,214	156.61	148.77	7.84	5.0%
Large Commercial	11,812	1,348.08	1,280.74	67.34	5.0%
Industrial	137,808	14,194.78	13,482.04	712.74	5.0%

**Beartooth Electric Cooperative, Inc.**  
**Proposed Rate Structure**  
**Option 2**

**Current Rates**

	Avg Customers	kWh	Facility Charge	Demand Charge	Avg Demand	kWh Rate	Revenue	% Decrease	Revenue Decrease	Adjusted Revenues
Residential	5,517	49,805,897	33.50	-	5.10	0.103160	7,355,800	-4.5%	(331,011)	7,024,789
Irrigation	55	2,954,640	121.80	12.40	22.36	0.057036	431,900	0.0%	-	431,900
Small Commercial	355	5,171,537	33.50	-	4.41	0.101408	667,100	-15.0%	(100,065)	567,035
Large Commercial	18	2,551,434	111.65	12.40	39.91	0.062778	291,200	-4.5%	(13,104)	278,096
Industrial	1	1,653,700	218.25	12.40	395.90	0.065797	170,300	-4.5%	(7,664)	162,637
Totals	<u>5,946</u>	<u>62,137,208</u>					8,916,300		(451,844)	8,464,457
Other revenues							44,800		-	44,800
Total revenues							<u>8,961,100</u>		<u>(451,844)</u>	<u>8,509,257</u>

**Proposed Rates**

	Avg Customers	kWh	Facility Charge	Demand Charge	Avg Demand	kWh Rate	Revenue	Decrease in kWh Charge	Decrease in Revenue
Residential	5,517	49,805,897	33.50	-	5.10	0.096514	7,024,789	6.4%	4.5%
Irrigation	55	2,954,640	121.80	12.40	22.36	0.057035	431,900	0.0%	0.0%
Small Commercial	355	5,171,537	33.50	-	4.41	0.082050	567,035	19.1%	15.0%
Large Commercial	18	2,551,434	111.65	12.40	39.91	0.057648	278,096	8.2%	4.5%
Industrial	1	1,653,700	218.25	12.40	395.90	0.061140	162,637	7.1%	4.5%
Totals	<u>5,946</u>	<u>62,137,208</u>					8,464,457		<u>5.1%</u>
Other revenues							44,800		
Total revenues							<u>8,509,257</u>		

**Effect**

"Average" Bill	Average kWh	Old	New	Difference	% Difference
Residential	752	111.11	106.11	5.00	4.5%
Irrigation	4,397	649.84	649.83	0.00	0.0%
Small Commercial	1,214	156.61	133.11	23.50	15.0%
Large Commercial	11,812	1,348.08	1,287.48	60.60	4.5%
Industrial	137,808	14,194.78	13,553.01	641.77	4.5%



**Beartooth Electric Cooperative, Inc.**  
**Proposed Rate Structure**  
**Option 3**

**Current Rates**

	Avg Customers	kWh	Facility Charge	Demand Charge	Avg Demand	kWh Rate	Revenue	% Decrease	Revenue Decrease	Adjusted Revenues
Residential	5,517	49,805,897	33.50	-	5.10	0.103160	7,355,800	-5.0%	(367,790)	6,988,010
Irrigation	55	2,954,640	121.80	12.40	22.36	0.057036	431,900	-2.0%	(8,638)	423,262
Small Commercial	355	5,171,537	33.50	-	4.41	0.101408	667,100	-8.0%	(53,368)	613,732
Large Commercial	18	2,551,434	111.65	12.40	39.91	0.062778	291,200	-5.0%	(14,560)	276,640
Industrial	1	1,653,700	218.25	12.40	395.90	0.065797	170,300	-5.0%	(8,515)	161,785
Totals	<u>5,946</u>	<u>62,137,208</u>					8,916,300		(452,871)	8,463,429
Other revenues							44,800		-	44,800
Total revenues							<u>8,961,100</u>		<u>(452,871)</u>	<u>8,508,229</u>

**Proposed Rates**

	Avg Customers	kWh	Facility Charge	Demand Charge	Avg Demand	kWh Rate	Revenue	Decrease in kWh Charge	Decrease in Revenue
Residential	5,517	49,805,897	33.50	-	5.10	0.095775	6,988,010	7.2%	5.0%
Irrigation	55	2,954,640	121.80	12.40	22.36	0.054111	423,262	5.1%	2.0%
Small Commercial	355	5,171,537	33.50	-	4.41	0.091080	613,732	10.2%	8.0%
Large Commercial	18	2,551,434	111.65	12.40	39.91	0.057077	276,640	9.1%	5.0%
Industrial	1	1,653,700	218.25	12.40	395.90	0.060625	161,785	7.9%	5.0%
Totals	<u>5,946</u>	<u>62,137,208</u>					8,463,429		<u>5.1%</u>
Other revenues							44,800		
Total revenues							<u>8,508,229</u>		

**Effect**

"Average" Bill	Average kWh	Old	New	Difference	% Difference
Residential	752	111.11	105.55	5.56	5.0%
Irrigation	4,397	649.84	636.98	12.86	2.0%
Small Commercial	1,214	156.61	144.07	12.54	8.0%
Large Commercial	11,812	1,348.08	1,280.74	67.34	5.0%
Industrial	137,808	14,194.78	13,482.04	712.74	5.0%