BOROUGH OF EPHRATA ELECTRIC DEPARTMENT

2019 Cost of Service and Retail Rate Study

FINAL REPORT
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prepared by

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1 Executive Summary

GDS Associates, Inc. ("GDS") has performed a financial review, allocated cost of service analysis, and retail rate review for the Borough of Ephrata Electric Department ("Ephrata", or the "Borough", or the "Utility") as a joint effort with the Borough's management and staff. Ephrata desired that the study also address the following specific objectives:

- Balance revised rates and cost of service results – Ensure rate levels are aligned with the cost to provide service while limiting the revenue change for customers within each rate class.
- Review and update unbundled costs – Update the unbundled energy and distribution rates to reflect the cost of service results.
- Continue focus on cost-based rates – Develop rates based on the updated cost of service and implement gradual changes in rates where applicable.
- Update the Power Cost Adjustment – Revise base rates to include the level of power cost projected for 2019. Provide guidance on future PCA revisions.
- Develop a treatment for possible AMP peaking resource – Develop a plan to recover costs and benefits related to the potential, new peaking generation resource with AMP. It is proposed to not include the cost in base rates and instead fund the net cost that occurs in the first two years of the project with available reserve funds. In the third year, the net benefit will flow through the PCA, the same as with any other resource.

This discussion consists of four major sections. The first section reviews the overall financial position of the utility and examines the total revenue requirements. The second section addresses the allocated cost of service analysis which evaluates the revenues produced by each rate class considering the costs incurred to serve each rate class. The third section reviews the present and revised retail rate schedules based on the financial review and cost of service analysis results. The fourth section presents thoughts for future consideration.

1.1 FINANCIAL REVIEW

The objective of this first phase of the project is to determine the magnitude of overall revenue required to attain Ephrata's financial objectives and maintain a sound financial position. The results of the financial review are shown in TABLE 3-2 and provide the primary result summarized as follows:

INCREASE OF 0.5% TO PRESENT REVENUE LEVELS ● Increasing current rate levels by 0.5% is projected to produce revenues sufficient to meet all operating expenses, debt service requirements, and all desired levels of transfer to the Borough's General and Capital Reserve funds for the adjusted test year and produce a net profit margin of 1.5%.

1.2 ALLOCATED COST OF SERVICE ANALYSIS

A primary objective or result of the cost of service analysis is to determine the operating margins of each of the retail rate classes. This analysis provides an equitable, cost-based approach in determining the revenue requirements and retail rate charges for the various rate schedules. FIGURE 4-3 demonstrates the rate of return percentages for each rate class under present and proposed rates.

1.3 RETAIL RATE REVIEW

TABLE 5-1 demonstrates increasing the proposed revenue by 0.5% compared to the Borough's present retail rate schedules. While there is a small increase in the overall revenue level, GDS recommends making certain rate structure changes to ensure cost-based rates. Structure changes will produce both bill increases and bill decreases depending on customer's usage characteristics.

The following is a summary of the rate structure revisions that are generally applicable to all or several rate classes:

INCREASED CUSTOMER CHARGES ● Customer charges have been increased to reflect cost of service results and provide increased revenue stability by increasing fixed cost recovery. The increased customer charges also recover the costs of Borough-owned street lighting.

ROLL PCA INTO BASE RATES ● All of the revised rates have been developed to include the 2019 base power cost level of $0.07358/kWh-sold. The Power Cost Adjustment ("PCA") will be administered to recover the differences (plus or minus) between Ephrata's actual power cost as determined by the PCA formula and the base power cost.

1.4 NEXT STEPS

The revised retail rate charges, under normal conditions, should allow Ephrata to meet its operating and financial obligations for the next 3-4 years. Even though it is anticipated that rate levels will not need to be revised for a number of years, GDS recommends that the utility include the following items in its future consideration of retail rate matters:

1.4.1 Fixed Cost Recovery

Distributed Energy Resources ("DER") can significantly impact a utility's recovery of the fixed costs of providing service to its customers. DER can include the following technologies:

- Demand Response (DR)
- Energy Efficiency (EE)
- Customer-Owned Behind-the-Meter (BTM) Generation
- Community Solar
- Storage Programs, including batteries and thermal storage

Like the vast majority of utilities, a reduction in energy consumption due to DER by one of the Borough's residential customers results in unrecovered fixed costs from that consumer. In the short run, reduced fixed cost recovery leads to lower margins for the utility. In the long run, reduced fixed cost recovery often leads to cost shifting between the utility's customers.

Utilities are employing various rate structure alternatives to address and mitigate the impacts of reduced fixed cost recovery. Such alternatives include the following listed below, and it is recommended that the Borough consider them to better ensure fixed cost recovery in the future:

- **Customer Charge Increase** – increasing the fixed customer charge to collect a greater share of fixed costs is one approach many utilities have employed in recent years.

- **Residential Demand Charge** – Now more viable with AMI, the residential demand rate can be designed to better ensure the recovery of fixed costs and better reflects the costs incurred by the utility for the customer, demand, and energy classifications of costs. Significant marketing and customer education is typically required to provide for successful implementation.

- **Minimum Bill Provision** –Raising the minimum bill provision is a way to increase fixed cost recovery from customers with extremely low usage due to DER, especially solar generation.

1.4.2 Rate Options with AMI

The rollout of AMI and the availability of hourly-interval load data presents numerous opportunities for time-based rate structures. The primary goal is to provide a price signal that reflects the relative cost of power over different time periods. Several rate design options can be contemplated in a time-based design. The most common time-based rate designs include:

- **Time-of-Use ("TOU") Energy Rate** –The TOU rate can be offered as an optional rate for customers or might be required for all customers. TOU rates that provide a price incentive for overnight charging of electric vehicles would also fall under this category.

- **Time-of-Use Demand Rate** – A few utilities have implemented time-based demand rates. As mentioned above, one of the primary reasons to consider a residential demand rate is to provide for the improved recovery of fixed costs, and in a cost-based manner. There are many factors to consider in designing the residential demand rate. There is a wide range of cost and billing demand structure alternatives to consider with the demand rate.

- **Critical Peak Pricing ("CPP")** – CPP rates are structured to charge very high rates for a select few "critical" hours of the year. Usually, these are the hours when power costs are highest and most of the utility's peak demand costs are incurred. The objective of the rate is to provide a price signal mirroring the timing and amount of those costs.

1.5 RECOMMENDATIONS

Based on results of the study as described herein, the Borough proposes the following recommendations

1. **Increase overall revenue by 0.5%** – Ephrata has determined that revenues produced under present rate levels, including the PCA, should be increased by 0.5% to meet revenue requirements.

2. **Increase overall revenue for each rate class by 0.5%** – The revenue level of all classes should be increased by the same amount since the returns for each class are relatively consistent with the returns for the overall system.

3. **Re-structure the Borough's rates to reflect the costs to provide service** - In all of the Borough's revised rates, the monthly customer charges are increased (except GS-Total Electric where the customer charge stays the same) consistent with cost of service results. The energy charges are decreased to reflect lower power supply costs and the distribution charges have increased to reflect the higher level of Borough distribution costs.

4. **Re-set the power cost base to zero** – All of the revised rates have been developed to include the level of power cost that is projected for the year 2019. Stated on a per kWh-sold basis, the base power cost included in the revised rates is $0.07358/kWh-sold. The PCA will continue to be administered to recover the differences (plus or minus) between Ephrata's actual power cost as determined by the PCA formula, and the base power cost.

5. **Rate Treatment for the proposed 2020 AMP Peaking Resource** - During the first two years of the 2020 AMP peaking project, the Borough will fund the net cost from available reserve funds. Beginning in 2022, all costs and benefits will flow the PCA.

2 Introduction

The following discussion and exhibits comprise the analyses, findings and recommendations regarding the financial review, allocated cost of service analysis, and retail rate review for the Borough of Ephrata Electric Department ("Ephrata", or the "Borough", or the "Utility") performed as a joint effort of GDS Associates, Inc. ("GDS") and the Borough's management. This discussion consists of four major sections. The first section reviews the overall financial position of the Borough, examines the total revenue requirements, and determines the sufficiency of present rate levels. The second section addresses the allocated cost of service analysis which evaluates the revenues produced by each rate class in light of the costs incurred to serve each rate class, thereby developing an estimated revenue requirement for each rate class. The third section reviews the present and revised retail rate schedules based on the financial review and cost of service analysis results. The fourth section presents thoughts for future consideration.

(1) **Balance revised rates and cost of service results** – Ephrata has determined that revenues produced under present rate levels, including the PCA, should be increased by 0.5% to meet revenue requirements. While one objective of the rate study is to ensure alignment of class rate levels with the cost to provide service, the Borough also desires to limit the revenue change for customers within each rate class.

(2) **Review and update unbundled costs** – In the prior study, the Borough's rates were unbundled. The energy cost portion of each rate was established as a separate $/kWh charge to create a basis of comparability with energy suppliers that provide service in the Pennsylvania customer choice environment. The prior revised rates also broke out customer and distribution related costs. In this study, the unbundled costs have been updated in a consistent fashion as in the prior study.

(3) **Continue focus on cost-based rates** – Rates are updated to reflect the updated unbundled costs. That is, for each rate, the combination of the customer charge and the distribution charge were designed to fully recover distribution costs. And, energy charges were developed to fully recover power supply costs. While overall costs have remained relatively stable, the distribution portion of the costs have increased, and the power supply costs have declined by approximately the same amount. For most of the rates, the customer charges have been increased in a gradual manner reflecting higher overall distribution costs.

(4) **Update the Power Cost Adjustment** – All of the revised rates, have been developed to include the level of power cost that is projected for the year 2019. Stated on a per kWh-sold basis, the base power cost included in the revised rates is $0.07358/kWh. The PCA will continue to be administered according to the PCA formula to recover the differences (plus or minus) between Ephrata's actual power cost and the base power cost. Guidelines have been provided in Section 5.7 to assist the Borough in administering the PCA and considering future changes to the PCA.

(5) **Develop a rate treatment for possible AMP peaking resource** - The Borough is contemplating whether to pursue a new peaking generation resource with AMP. As further described in Section 5.7, it is proposed to not include the cost of the resource in revenue requirements, i.e., base rates, since the decision has not yet been made to go forward with the resource. Further, due to the unique nature of the resource costs and benefits, it is proposed to recover the net cost of the resource through the use of reserve funds for a two-year period, and be excluded from the PCA. After that time, the costs and benefits of the resource would flow through the PCA until such time that a subsequent cost of service study is performed, and base rates are updated.

3 Financial Review

The objective of this first phase of the project is to determine the magnitude of overall revenue required to attain Ephrata's financial objectives and maintain a sound financial position, including the recovery of margins adequate to provide for the desired level of transfers to the Borough's General and Capital Reserve funds.

The financial review was performed to evaluate overall financial adequacy of existing retail rate charges and is based upon a 12-month test period ending December 31, 2016. As shown in TABLE 3-1, the actual revenues and expenses booked for that test period indicate that the Borough realized total margins, after transfers, of $1,907,737. The resulting net profit margin was 11.8%

TABLE 3-1 2016 Test Year Income Statement

Item	Per Books Amount
(a)	(b)
Operating Revenues	
Base	$16,133,708
PCA	($166,219)
Other	$169,348
Total Operating Revenues	$16,136,837
Operating Expenses	
Purchased Power	$10,750,140
Operating Expense	$2,808,404
Total Operating Expenses	$13,558,544
Operating Margins	**$2,578,292**
Non-Operating Margins	
Interest and Other	$245,446
Transfers	($2,819,398)
Total Non-Operating Margins	($2,573,952)
Total Margins	**$4,340**
Operating Profit Margin	**16.0%**
Net Profit Margin	**0.0%**

To determine the revenue requirement for ratemaking purposes, several adjustments were made to the 2016 actual revenues and expenses, as shown in column (c) of TABLE 3-2. These adjustments are generally made to exclude abnormal or non-recurring items, and to incorporate known and measurable changes in the revenues and expenses. The overall purpose of these adjustments is to enable the test period to reflect a typical on-going financial position for the Borough. Because the revised rates will become effective with the first billing cycle after May 1, 2019 both power supply and distribution expenses and

fund transfer amounts were adjusted to projected 2019 levels.

PCA factors are reflective of the 2019 AMP budget, with adjustments for test year kWh and the behind-the-meter solar generation projected but not included in AMP's budget. The PCA and RSF is further described in Section 5.

The 2019 budget included an additional $75,000 for a partial year transfer to the city for the solar resource. Going forward, this transfer will be $150,000 per year, so GDS has added an additional $75,000 to reflect a normalized amount. The 2019 budget did not include the additional $33,500 per year expense for PMEA dues, so that amount has been included in addition to budgeted membership fees.

The distribution and power supply adjustments are demonstrated in the Adjusted Income Statement in TABLE 3-2. The table also includes the proposal of increasing revenues by 0.5%, or $85,000, to achieve total revenue of $16.9 million, while rolling the PCA into base rates and resetting the PCA to zero. GDS and Borough management conclude that the proposed rate levels produce revenues sufficient to meet all operating expenses, debt service requirements, and all desired levels of transfer to the Borough's funds. The detailed adjusted income statement can be found in **APPENDIX A.**

TABLE 3-2 Adjustments to 2016 Test Year Operating Expenses

Item	Per Books Amount	Adjustments	Adjusted Test Year	Proposed Change	Pro Forma
(a)	(b)	(c)	(d)	(e)	(f)
Operating Revenues					
Base	$16,133,708	$114,847	$16,248,555	$474,467	$16,723,022
PCA	($166,219)	$555,955	$389,736	($389,736)	$0
Other	$169,348	$12,696	$182,044	$0	$182,044
Total Operating Revenues	$16,136,837	$683,498	$16,820,335	$84,731	$16,905,066
Operating Expenses					
Purchased Power	$10,750,140	($808,980)	$9,941,160	$0	$9,941,160
Operating Expense	$2,808,404	$771,928	$3,580,332	$0	$3,580,332
Total Operating Expenses	$13,558,544	($37,052)	$13,521,492	$0	$13,521,492
Operating Margins	**$2,578,292**	**720,550**	**$3,298,843**	**$84,731**	**$3,383,574**
Non-Operating Margins					
Interest and Other	$245,446	$(158,946)	$86,500	$0	$86,500
Transfers	($2,819,398)	($395,672)	($3,215,070)	$0	($3,215,070)
Total Non-Operating Margins	($2,573,952)	($554,618)	($3,128,570)	$0	($3,128,570)
Total Margins	**$4,340**	**$165,932**	**$170,273**	**$84,731**	**$255,004**
Operating Profit Margin	**16.0%**		**19.6%**		**20.0%**
Net Profit Margin	**0.0%**		**1.0%**		**1.5%**

4 Allocated Cost of Service Analysis

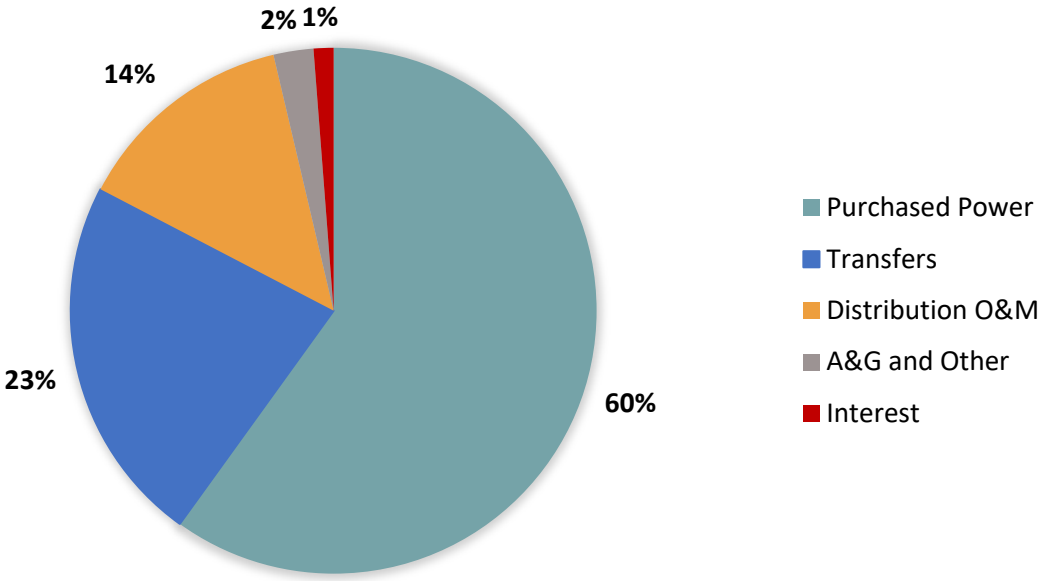
The cost of service analysis is conducted to determine the adequacy of the revenues produced by each of the retail rate schedules in light of the cost of providing service to the customers served under those rate schedules. This analysis provides a more equitable, cost-based approach in determining the revenue requirements and retail rate charges for the various rate schedules.

The techniques and procedures used by GDS to perform the cost allocation for the Borough generally follow the guidelines set forth in the Cost Allocation Manual prepared by the National Association of Regulatory Utility Commissioners ("NARUC"). The NARUC cost allocation principles are widely considered as an industry standard. The Manual provides a range of acceptable cost allocation methods, and GDS used the methods that are most appropriate for the Borough.

The process consists of three basic steps: functionalization, classification, and allocation. Typically, these steps utilize utility plant information. Since the Borough does not have utility plant accounting records, the process used results from other cost of service studies for similarly situated utilities where plant data is required for the analysis.

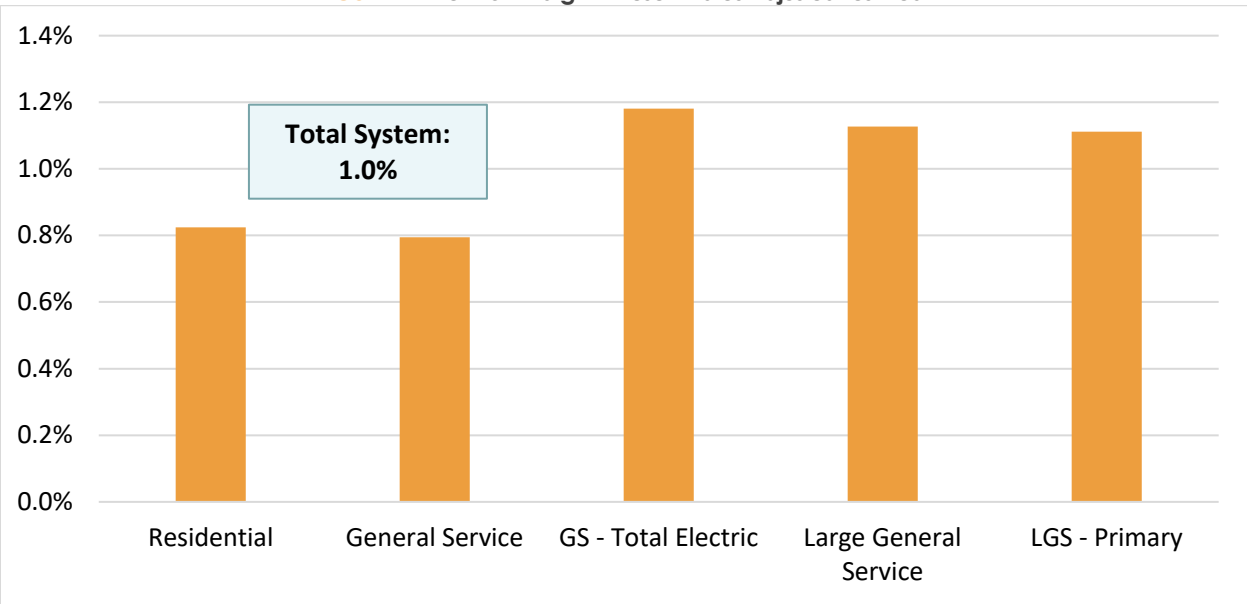
Functionalization is accomplished by categorizing the Borough's operating expenses into production, transmission, distribution, and general functions. FIGURE 4-1 demonstrates the functionalized electric utility expenses of the Borough. The classification step separates the distribution operating expenses into demand-related and customer-related components. Purchased power costs were classified as either demand-related or energy-related.

FIGURE 4-1 Breakout of Expenses



The allocation step consists of spreading the classified expenses to the various rate classes based on appropriate customer and usage characteristics for those rate classes, such as number of customers, energy consumption, and peak demand responsibility. The results of the cost of service analysis under the present rates are summarized in FIGURE 4-2. The differences in net profit margin among the rate classes under the present rates is not atypical or unusual, compared to other utilities.

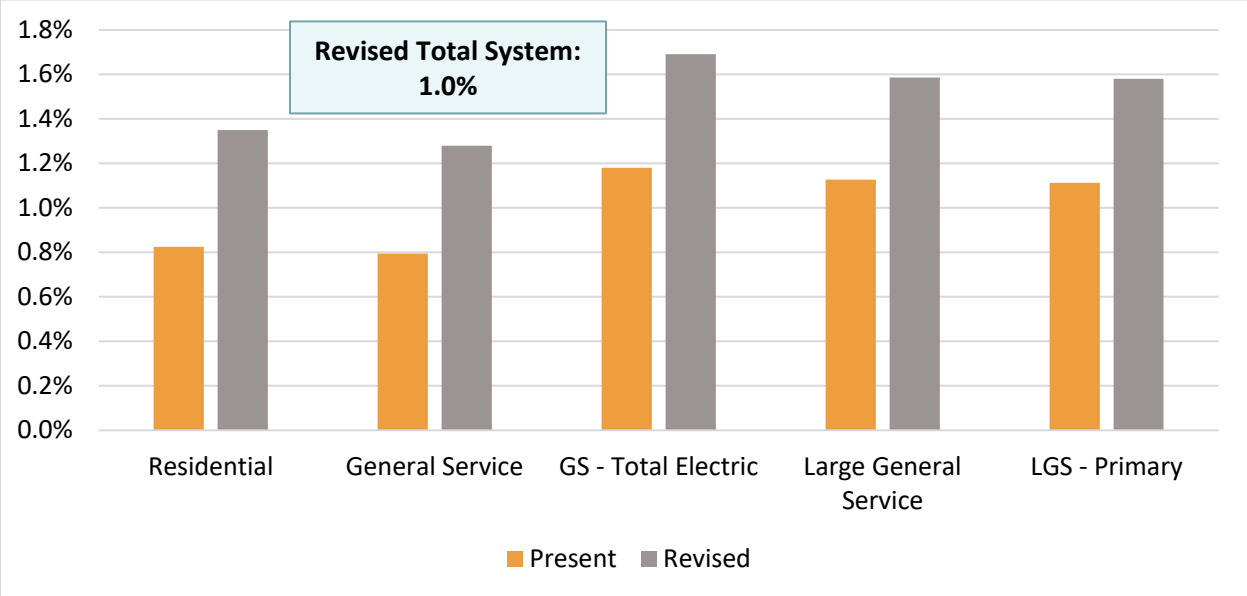
FIGURE 4-2 Net Profit Margin – Present Rates Adjusted Test Year



During the 2016 test year, billing demands for the Large General Service and the Large General Service – Primary rate classes were billed incorrectly due to a meter reading issue. GDS used 2018 billed demands for these rate classes to compute monthly load factors to apply to 2016 kWh sales and to compute estimated demand billing units for the 2016 test year. The estimated demands are used in both the cost of service analysis and the development of revised rates.

A summary of the cost of service results for revised rates are shown in FIGURE 4-3. The revenue level for each class remains unchanged, even with shifts in rate structure. The rate levels are demonstrated in TABLE 5-1. The allocated income statement can be found in **APPENDIX B.**

FIGURE 4-3 Net Profit Margin – Present and Revised Rates



Another important cost of service result is the unit cost summary, which summarizes the per-unit cost of each functional cost category for each rate class. Such costs are used in the development of retail rate charges. The unit cost summary can be found in **APPENDIX C.**

The Borough recorded annual revenues of only $19,500 for security light services during the 2016 test year. Since the Borough does separately record maintenance costs specific to lighting, cost of service results are based on an estimated expense level. Due to the very small level of revenues and costs from this security light class, it is excluded from the cost of service results presented herein and any impacts from the exclusion are not material.

5 Retail Rate Review

The following is a summary of the review of, and revisions to, the Borough's present retail rate schedules. As previously mentioned, the retail rates have been developed to produce aggregate annual revenue sufficient to satisfy the Borough's overall revenue requirements, including an adequate operating margin, transfers, and Debt Service Coverage ("DSC") levels. Present overall revenue levels are increased by 0.5% to meet Ephrata's revenue requirements. Further, it is recommended that the revenue level of all classes are increased by the same amount since the returns for each class are relatively consistent with the returns for the overall system. This result is best demonstrated in TABLE 5-1.

TABLE 5-1 Rate Changes by Class

Class	Present Net Profit Margin	Proposed Net Profit Margin	Rate Change
(a)	(b)	(c)	(d)
Residential	0.8%	1.3%	0.5%
General Service	0.8%	1.3%	0.5%
General Service - Total Electric	1.2%	1.7%	0.5%
Large General Service	1.1%	1.6%	0.5%
Large General Service - Primary	1.1%	1.6%	0.5%
Total System	1.0%	1.5%	0.5%

CUSOMER CHARGES ● The monthly customer charges for each of the rate classes, with one exception, have been increased. TABLE 5-2 below summarizes the increase for each of the rate classes. There are a number of reasons for the increase to the monthly customer charges:

1. Fixed cost recovery - The increase is consistent with the Borough's fixed, customer related costs of providing basic service to its customers as identified by the cost of service.
2. Recovers Borough's outdoor lighting - The charges include recovery of the Borough's un-metered street lighting costs.
3. Increases revenue stability - the increase provides some increased revenue stability to the Borough since cost recovery is shifted from load-based (kWh) charges that fluctuate due to weather conditions to a fixed monthly charge that provides revenue not tied to electric load.
4. PMEA Dues – The Borough's increased dues payment to PMEA of $33,500 is recovered by the residential customer charge. This amount translates into approximately $0.50/month for each customer.

It should be noted that the cost of service results, specifically the monthly costs of providing basic service, are a primary consideration in the determination of the revised customer charges. For some rate classes, use of the cost of service results would have resulted in too large of an increase in the monthly customer charge. In those cases, the customer charge was increased in a gradual manner. Consistent with the cost-based approach used to develop the unbundled charges, the remaining portion of distribution related costs not recovered by the customer charge are recovered by distribution energy and demand charges, as applicable to each rate schedule.

TABLE 5-2 Customer Charge Summary

Class	Present Customer Charge	Revised Customer Charge	Cost of Service Customer-Related Costs
(a)	(b)	(c)	(d)
Residential			
Standard	$12.00	$14.00	$16.92
Three-Phase	$27.75	$29.75	
Borderline	$25.85	$27.75	
General Service			
Standard	$21.75	$25.00	$50.52
Three-Phase	$34.33	$37.50	
General Service - Total Electric			
Standard	$52.50	$52.50	$51.96
Three-Phase	$74.50	$74.50	
Large General Service	$110.00	$125.00	$132.10
Large General Service - Primary	$135.00	$150.00	$550.48

The Borough implemented a PCA provision in 2013. All of the revised rates have been developed to include the level of power cost that is projected for the year 2019 ("base" power cost). Stated on a per kWh-sold basis, the base power cost included in the revised rates is $0.07358/kWh. Beginning with the implementation of the revised rates, the PCA will be administered to recover the differences (plus or minus) between Ephrata's actual power cost as determined by the PCA formula, and the base power cost. In the event that actual power cost is equal to the base power cost, then the billed PCA factor would be zero. Beginning in 2022, the PCA will track the additional costs related to the AMP peaking resource, if the project is approved by Ephrata.

In all of the Borough's revised rates, the monthly customer charges are increased (except GS-Total Electric where the customer charge stays the same) consistent with cost of service results. The energy charges are decreased to reflect lower power supply costs and the distribution charges have increased to reflect the higher level of Borough distribution costs. As with all rates, the PCA for projected 2019 power cost levels, as described above, is included in base rates. The PCA was adjusted to $0.0000 / kWh-sold for sales to all classes during the adjusted test year.

While the overall revenue levels of each rate class are increased by only 0.5%, the re-structured rates will produce some differences in customer bill impacts, depending upon the volume of energy and load factor of the customer. Further explanation of customer bills impacts is provided for each rate.

The Borough has undertaken a number of efforts to manage and lower its power supply cost, which are reflected in the revised balance of charges as described above. There are two such examples. At the time of this report, the Borough is contemplating whether to pursue a new peaking generation resource with AMP. The proposed resource is 5.4 MW of diesel generation that would be located on the Borough's

distribution system and behind the wholesale power of delivery. Under the present plan, the resource could be operational in late 2019 or early 2020, prior to the establishment of the zonal 1-hour winter peak demand used to determine demand responsibilities in PJM for network transmission service. The diesel generation will also lower the Borough's generation capacity requirement and avoid exposure to the highest of the hourly market energy prices.

In a similar fashion, the Borough's 3.5 MW solar resource, planned to be operational before June 1, 2019, prior to the establishment of the 5-hour peak demand used to determine demand responsibilities in PJM for generation capacity, will also be located on the Borough's distribution system. The solar resource will provide the same types of generation and transmission credits as the diesel generator, and it will also result in avoided market energy purchases.

5.1 RESIDENTIAL

The Borough bills the majority (approx. 5,800) of its customers under the Residential Rate Schedule. The rate is applicable to residential premises where the predominant use of electric energy is for domestic purposes.

Generally, customers with lower energy usage (less than 900 kWh) will experience increased cost, and higher use customers will experience reduced cost. The present and proposed rates are shown in TABLE 5-3. **APPENDIX D** has been developed to demonstrate the customer bill impacts at various usage levels.

TABLE 5-3 Rate Comparison – Residential

Item	Present Rates	Revised Rates
(a)	(b)	(c)
Standard Customer Charge	$12.00	$14.00
3-Phase Residential Customer Charge	$27.75	$29.75
Borderline Customer Charge	$25.85	$27.75
Energy Charge ($/kWh)	$0.0865	$0.0800
Distribution Charges ($/kWh)		
First 300 kWh	$0.0390	$0.0468
Next 700 kWh	$0.0240	$0.0318
Over 1,000 kWh	$0.0190	$0.0268
PCA ($/kWh)	$0.0030	$0.0000

5.2 GENERAL SERVICE

The Borough presently serves approximately 600 customers under the "GS" rate. These are commercial or industrial customers that typically use less than 15,000 kWh per month or have a demand of less than 41kW with a load factor of 50%.

Shifting cost recovery from the energy charge and PCA to the customer charge and distribution charges will produce some differences in customer bill impacts dependent on usage. The present and proposed rates are shown in TABLE 5-4.

TABLE 5-4 Rate Comparison – General Service

Item	Present Rates	Revised Rates
(a)	(b)	(c)
Standard Customer Charge	$21.75	$25.00
3-Phase Residential Customer Charge	$34.33	$37.50
Energy Charge ($/kWh)	$0.0850	$0.0780
Distribution Charges ($/kWh)		
First 1,500 kWh	$0.0590	$0.0677
Over 1,500 kWh	$0.0390	$0.0477
PCA ($/kWh)	$0.0030	$0.0000

5.3 GENERAL SERVICE – TOTAL ELECTRIC

The Borough offers a different rate for similar sized commercial or industrial customers as those billed under the "GS" rate, but the rate eligibility is limited to those customers that use electricity as the source of energy for space heating as well as water heating. There are presently approximately 175 customers served under the GS-Total Electric Rate.

Unlike the other rates, the monthly customer charge was not increased in the revised rate. The current charge of $52.50 already recovers the full customer costs as determined in the cost of service and does not need to be further increased.

Shifting cost recovery from the energy charge and PCA to the customer charge and distribution charges will produce some differences in customer bill impacts dependent on usage. The present and proposed rates are shown in TABLE 5-5.

TABLE 5-5 Rate Comparison – General Service – Total Electric

Item	Present Rates	Revised Rates
(a)	(b)	(c)
Standard Customer Charge	$52.50	$52.50
3-Phase Residential Customer Charge	$74.50	$74.50
Energy Charge ($/kWh)	$0.0770	$0.0665
Distribution Charges ($/kWh)		
First 1,500 kWh	$0.0460	$0.0602
Over 1,500 kWh	$0.0360	$0.0502
PCA ($/kWh)	$0.0030	$0.0000

5.4 LARGE GENERAL SERVICE

Ephrata presently serves approximately 75 accounts under GS-Large Rate. The rate is applicable to commercial and industrial customers taking service at a secondary voltage and whose usage is typically more than 15,000 kWh per month or have a demand greater than 41 kw with a load factor of 50%.

As previously mentioned, GDS developed estimated billing demands based on 2018 billing data for the Large General Service class to correct for billing demand errors in the 2016 test year. The revised rates have been developed based on the estimated billing demands. The present demand charge of $4.25 was developed to be consistent with the GS-3 rate offered by PPL for comparably-sized commercial and industrial customers. The demand charge in the revised rates has been reduced to remain consistent with reductions in PPL's GS-3 demand charge since the prior study. The remaining distribution costs are recovered by the distribution energy charges.

Shifting cost recovery from the energy charge and PCA to the customer charge and distribution charges will produce some impacts to customer bills dependent on usage and load factor. The present and proposed rates are shown in TABLE 5-6.

TABLE 5-6 Rate Comparison – Large General Service

Item	Present Rates	Revised Rates
(a)	(b)	(c)
Standard Customer Charge	$110.00	$125.00
Energy Charge ($/kWh)	$0.0774	$0.0710
Distribution Charges ($/kWh)		
First 7,500 kWh	$0.0270	$0.0374
Next 17,500 kWh	$0.0240	$0.0344
Over 25,000 kWh	$0.0200	$0.0304
Demand Charge ($/kW)	$4.25	$4.00
PCA ($/kWh)	$0.0030	$0.0000

5.5 LARGE GENERAL SERVICE – PRIMARY

Ephrata has two commercial/industrial accounts billed under its Large General Service – Primary Rate. This rate is applicable to those customers that own the transformation equipment at the point of delivery, thus, the Borough provides service at the high-side primary voltage.

As with the Large General Service rate, estimated billing demands based on 2018 billing data were used for the development of the revised demand charge. To remain consistent with PPL's rates, the demand charge has been reduced to $2.75. The remaining distribution costs are recovered by the distribution energy charges.

Shifting cost recovery from the energy charge and PCA to the customer charge and distribution charges will produce some impacts to customer bills dependent on usage and load factor. The present and proposed rates are shown in TABLE 5-7.

TABLE 5-7 Rate Comparison – Large General Service – Primary

Item	Present Rates	Revised Rates
(a)	(b)	(c)
Standard Customer Charge	$135.00	$150.00
Energy Charge ($/kWh)	$0.0765	$0.0670
Distribution Charges ($/kWh)		
First 15,000 kWh	$0.0290	$0.0426
Next 85,000 kWh	$0.0260	$0.0396
Over 100,000 kWh	$0.0200	$0.0336
Demand Charge ($/kW)	$3.00	$2.75
PCA ($/kWh)	$0.0030	$0.0000

5.6 LIGHTING

The security lighting class as reflected in the cost of service class consists of approximately $1,625 per month of revenue. As discussed in Section 4, the cost of service does not produce meaningful results for this class. No change in revenue is proposed for the security lighting class at this time.

5.7 POWER COST ADJUSTMENT

The Borough implemented a Power Cost Adjustment ("PCA") provision in 2013. As a part of the rate study that was completed in 2014, revised rates were developed to include the level of power cost that was projected for the year 2015 ("base" power cost). Stated on a per kWh-sold basis, the base power cost included in the revised rates was $0.08227/kWh. In March of 2017, the Borough lowered the base power cost to $0.07281/kWh. Each month the factor is determined based on the power cost and kWh sales for the preceding six-month period. This methodology strikes a balance between recovering cost on a current basis, and levelizing the factor in order to avoid undue fluctuations in the monthly factors.

All of the revised rates, as described herein, have been developed to include the level of power cost that is projected for the year 2019. Stated on a per kWh-sold basis, the base power cost included in the revised rates is $0.07358/kWh-sold. The PCA will continue to be administered to recover the differences (plus or minus) between Ephrata's actual power cost as determined by the PCA formula, and the base power cost. In the event that actual power cost is equal to the base power cost, then the billed PCA factor would be zero.

It is important to note that during first two years of the 2020 AMP peaking project, the Borough is expected to incur a net cost impact from the project. In subsequent years, the project is expected to produce a net benefit. During the first two years, the Borough will fund the net cost from available reserve funds. Also during this time, costs and benefits should be excluded from the PCA formula since reserves fund will provide the necessary coverage. This process will require some additional efforts to the PCA administration. (*GDS can provide a template for the PCA administration if desired by the Borough*). Beginning in 2023, when the peaking resource is expected to provide a net benefit, all costs and benefits will flow the PCA.

A decision faced by utilities is determining the best time to re-set the base power cost $/kWh amount. That is, when is it best to update the power cost base and move the recovery of power cost from the PCA to base rates. Over time, the Borough should expect that the level of actual power cost will be different than the 2019 base power cost, and such difference may produce factors that are either consistently positive (indicating higher power cost) or negative (indicating lower power cost).

It is desirable to avoid PCA factors that are too high of magnitude, either positive of negative, for two primary reasons.

1. The PCA tracks changes in overall power cost including energy as well as demand related generation and transmission costs. The factor recovers changes in all of these costs on a per-kWh basis. So, while PCA factors do track changes in overall power cost, the changes in demand related costs are recovered on a per-kWh basis, which is different than how these costs are incurred. When the PCA factor is small, this result is not material. With larger factors, it can be argued that demand related costs are not being appropriately recovered on the basis of the costs of providing service.

2. When PCA factors become too large, it can also result in concerns raised by customers especially when the PCA is shown as a separate line item on the power bill. Many customers are not knowledgeable of the reasons for the PCA and may raise questions when the charge becomes too large in their view.

Distribution utilities, such as the Borough, generally revise the underlying base power cost in two circumstances:

1. As an element of the rate study process, the base power cost is updated based on the level of power cost included in the adjusted test year. Costs recovered by the PCA are moved to base rates. The PCA will produce a factor of zero during months where the actual power cost is the same as the base.

2. Base power costs are also updated when it is concluded that the magnitude of the PCA factors are too great. As a rule of thumb, and for purposes of the example provided below, the utility determines that when the factor reaches a threshold, or trigger point, of $0.01000/kWh, the base power cost should be updated. In reality, each utility must determine for themselves the level at which the factor becomes unacceptably too large. This type of update occurs outside of a rate study process and is described below.

The following provides a summary approach that a utility can use to update the base power cost and the resulting PCA factors. The summary references the example provided in TABLE 5-8 below. The example assumes that the utility does not desire to change the overall of revenue; it merely desires to shift cost recovery from the PCA to base rates.

1. Update the base power cost – The base power cost is updated to reflect the average cost of power for a selected test year. The test year should be forward looking, commencing with the first month that the revised PCA becomes effective. Care should be taken to ensure that all underlying components of power cost are captured, and they are reflective of normal and annualized cost levels. (See **APPENDIX E** for the components included in the revised factor of $0.07358/kWh-sold developed for this study.) For the example in TABLE 5-8, base power cost is assumed to be updated from $0.07000/kWh-sold to $0.08000/kWh.

2. Update retail rate $/kWh energy rates – For all rates subject to the PCA, energy rates need to be updated. Increasing the base power cost, as shown in this example, will result in lower PCA factors. To achieve the same level of overall revenue as assumed in this example, the energy charges in each applicable rate should be increased by the change in the base power cost ($0.01000/kWh).

   It should be noted that if the base power cost is increased without revising energy rates, revenue levels will be decreased. Alternatively, if the base power cost is lowered without revising energy rates, revenue levels will be increased.

3. Update the PCA formula – The PCA formula should be updated to revise the base power cost. In this example, the base power cost is revised from $0.0700/kWh-sold to $0.08000/kWh.

TABLE 5-8 Example of Revision to PCA Base Power Cost – No Change in Overall Revenue Recovery

Item	Test Year for Rate Development	Future Year Increased Costs with Test Year Rates	Revised Base Power Cost and Energy Rate
(b)	(c)	(d)	(e)
Power Cost	$8,750,000	$10,400,000	$10,400,000
kWh Purchased	135,869,565	141,304,348	141,304,348
kWh Sold	125,000,000	130,000,000	130,000,000
$/kWh Purchased	$0.06440	$0.07571	$0.07792
$/kWh Sold (1)	$0.07000	$0.08000	$0.08000
PCA Base Power Cost	**$0.07000**	**$0.07000**	**$0.08000**
PCA	**$0.00000**	**$0.01000**	**$0.00000**
Retail Energy Rate	**$0.09000**	**$0.09000**	**$0.10000**
Total Energy Rate	$0.09000	$0.10000	$0.10000
Energy Charges at 1,000 kWh	$90.00	$100.00	$100.00
Notes:			
(1) Distribution Losses	8.00%		

6 Future Considerations

The revised retail rate charges, under normal conditions, should allow the Borough to meet its operating and financial obligations for the next 3-4 years. Even though it is anticipated that rate levels will not need to be revised for a number of years, GDS recommends that the utility include the following items in its consideration of future retail rate matters:

6.1 FIXED COST RECOVERY

Distributed Energy Resources ("DER") can significantly impact a utility's recovery of the fixed costs of providing service to its customers. DER can include the following technologies:

- Demand Response (DR)
- Energy Efficiency (EE)
- Customer-Owned Behind-the-Meter (BTM) Generation
- Community Solar
- Storage Programs, including batteries and thermal storage

The Borough's residential rate is considered a two-part rate structure consisting of a Customer Charge and energy charges. The energy charges are unbundled into an Energy Charge to recover power supply related costs and a Distribution Charge. With the proposed Customer Charge of $14/month in the residential rate, the cost of service demonstrates that, like almost all utilities, the Borough will continue to recover a majority of its of fixed costs through the Distribution Energy $/kWh charges[1]. A reduction in energy consumption under such rates due to DER such as distributed generation or battery storage results in unrecovered fixed costs from those consumers. In the short run, reduced fixed cost recovery leads to lower margins for the utility. In the long run, reduced fixed cost recovery often leads to cost shifting between the utility's customers.

With the increased implementation of DER, utilities are employing various rate structure alternatives to address and mitigate the impacts of reduced fixed cost recovery. Such alternatives include the following listed below, and it is recommended that the Borough consider them to better ensure fixed cost recovery in the future:

- Customer Charge Increase – increasing the fixed customer charge to collect a greater share of fixed costs is one approach many utilities have employed in recent years. This is one strategy incorporated in the revised rates as described herein.

- Residential Demand Charge – with the rollout of AMI and the availability of hourly-interval load data for all customers, the addition of a demand charge to the residential rate is technologically viable. This three-part rate structure can be designed to better ensure the recovery of fixed costs and better reflects the costs incurred by the utility for the customer, demand, and energy classifications of costs. Significant marketing and customer education is typically required to provide for successful implementation. Introducing a demand charge can also create significant variations in cost impacts within the residential class. These advantages and disadvantages must be carefully weighed before the rate is implemented.

- Minimum Bill Provision – Another approach being considered and adopted by some utilities is to increase the minimum bill provision of the rate while leaving the customer charge as it is (thereby creating a minimum bill that is higher than the customer charge). Raising the minimum bill provision is a way to increase fixed cost recovery from customers with extremely low usage due

[1] Distribution related fixed costs for residential customers as determined by the Cost of Service are $16.93/month.

to DER, especially solar generation. Raising the minimum bill provision will still impact some low use customers, but not as many as raising the customer charge itself.

6.2 RATE OPTIONS WITH AMI

As mentioned above, the rollout of AMI and the availability of hourly-interval load data presents numerous opportunities for time-based rate structures. Due to the Borough's recent implementation of its AMI system, it was determined that there was not sufficient interval data available for this project to consider time-based rate structures. However, for the next rate study, expected to be conducted 3 or 4 years from now, the Borough will have plenty of load data to evaluate such rates.

Time-based rates are rate designs in which energy and/or demand is priced based on the time-of-day in which the consumption occurred. The primary goal is to provide a price signal that reflects the relative cost of power over different time periods. Several rate design options can be contemplated in a time-based design. The most common time-based rate designs include:

- Time-of-Use (TOU) Energy Rate – For this rate structure, the pricing varies based on the time of consumption within a day. There are defined on-peak and off-peak periods, which can also vary by season. The TOU rate can be offered as an optional rate for customers or might be required for all customers. TOU rates that provide a price incentive for overnight charging of electric vehicles would also fall under this category.

- Time-of-Use Demand Rate – A few utilities have implemented time-based demand rates. As mentioned above, one of the primary reasons to consider a residential demand rate is to provide for the improved recovery of fixed costs, and in a cost-based manner. There are many factors to consider in designing the residential demand rate. The scope of costs to be recovered by the demand charge must be determined, i.e., the extent to which generation, transmission, and distribution costs are included in the rate. Further, the basis of the demand must be determined. Billing demands can be calculated based on the customer's non-coincident peak, their non-coincident peak during an on-peak period, or it can be a demand coincident with the utility system peak demand.

- Critical Peak Pricing (CPP) – This rate is usually built on top of a TOU energy rate structure. CPP rates are structured to charge very high rates for a select few "critical" hours of the year. Usually, these are the hours when power costs are highest and most of the utility's peak demand costs are incurred. The objective of the rate is to provide a price signal mirroring the timing and amount of those costs. Consumers are often notified a day or hours in advance of a critical peak period. Sometimes, a CPP rate is coupled with enabling technology that gives the customer better tools to reduce their usage in response to CPP events.

7 Recommendations

7.1 RECOMMENDATIONS

Based on results of the study as described herein, the Borough proposes the following recommendations:

1. **Increase overall revenue by 0.5%** – Ephrata has determined that revenues produced under present rate levels, including the PCA, should be increased by 0.5% to meet revenue requirements. This revenue increase produces an additional $85,000 per year above present rate levels.

2. **Increase overall revenue for each rate class by 0.5%** – The revenue level of all classes should be increased by the same amount since the returns for each class are relatively consistent with the returns for the overall system. The residential and general service classes are slightly below the system return and the large general service and total electric rate classes are slightly above the system return. This relationship is maintained by the across the board 0.5% increase to each class.

3. **Re-structure the Borough's rates to reflect the costs to provide service** - In all of the Borough's revised rates, the monthly customer charges are increased (except GS-Total Electric where the customer charge stays the same) consistent with cost of service results. The energy charges are decreased to reflect lower power supply costs and the distribution charges have increased to reflect the higher level of Borough distribution costs.

4. **Re-set the power cost base to zero** – All of the revised rates have been developed to include the level of power cost that is projected for the year 2019. Stated on a per kWh-sold basis, the base power cost included in the revised rates is $0.07358/kWh-sold. The PCA will continue to be administered to recover the differences (plus or minus) between Ephrata's actual power cost as determined by the PCA formula, and the base power cost.

5. **Rate Treatment for the proposed 2020 AMP Peaking Resource** - During the first two years of the 2020 AMP peaking project, the Borough will fund the net cost from available reserve funds. Beginning in 2022, all costs and benefits will flow the PCA.

APPENDIX A • Adjusted Income Statement

BOROUGH OF EPHRATA
ADJUSTED INCOME STATEMENT
TWELVE MONTHS ENDED DECEMBER 31, 2016

Line No.	Item	Per Books	Adjustments	Notes	2019 Budget Adjusted	Proposed Change	Pro Forma
(a)	(b)	(c)	(d)		(e)	(f)	(g)
	Operating Revenue						
1	Base	$16,133,708	$114,847		$16,248,555	$474,467	$16,723,022
2	PCA	($166,219)	$555,955		$389,736	($389,736)	$0
3	Subtotal	$15,967,489	$670,802		$16,638,291	$84,731	$16,723,022
4	Other	$169,348	$12,696		$182,044	$0	$182,044
5	Total Revenue	$16,136,837	$683,498		$16,820,335	$84,731	$16,905,066
	Operating Expenses						
6	Purchased Power	$10,750,140	($808,980)		$9,941,160	$0	$9,941,160
7	Subtotal	$10,750,140	($808,980)		$9,941,160	$0	$9,941,160
8	Distrib.-Operation	$1,367,153	$458,479		$1,825,633	$0	$1,825,633
9	Distrib.-Maintenance	$69,862	$95,638		$165,500	$0	$165,500
10	O&M - Capital Outlay	$372,004	($72,004)		$300,000	$0	$300,000
11	Administrative & General	$351,972	$120,550		$472,522	$0	$472,522
12	Other Adjustments	$0	$0		$0	$0	$0
13	Subtotal	$2,160,991	$602,663		$2,763,655	$0	$2,763,655
14	Depreciation	$0	$0		$0	$0	$0
15	Property Tax	$0	$0		$0	$0	$0
16	Admin Charges to the General Func	$544,788	$41,889		$586,677	$0	$586,677
17	Total Debt Service AMI	$0	$205,000		$205,000	$0	$205,000
18	Other Deductions	$102,624	($77,624)		$25,000	$0	$25,000
19	Subtotal	$2,808,404	$771,928		$3,580,332	$0	$3,580,332
20	Total Expenses	$13,558,544	($37,052)		$13,521,492	$0	$13,521,492
21	**Operating Margins**	**$2,578,292**	**$720,550**		**$3,298,843**	**$84,731**	**$3,383,574**
22	Non-Operating Margins - Int	$13,901	$26,099		$40,000	$0	$40,000
23	Non-Oper. Marg.- Other	$40,698	$5,802		$46,500	$0	$46,500
24	Capital Contributions and Adjus.	$190,846	($190,846)		$0	$0	$0
25	Transfers In	$0	$0		$0	$0	$0
26	Transfers Out	($2,819,398)	($395,672)		($3,215,070)	$0	($3,215,070)
27	Total Margins	$4,340	$165,932		$170,273	$84,731	$255,004
28	**Operating Profit Margin**	**16.0%**			**19.6%**		**20.0%**
29	**Net Profit Margin**	**0.0%**			**1.0%**		**1.5%**
	Unrestricted Cash Balance						
30	Start of Year	$2,989,132			$3,772,058		$3,772,058
31	Changes	$4,340			$170,273		$255,004
32	Use of Cash for AMP Project	$0			($100,000)		($100,000)
33	End of Year	$2,993,472			$3,842,331		$3,927,062
34	Minimum Unrestricted Cash Policy	$2,355,854			$2,352,149		$2,352,149
	Rate Increase Amount						
35	Proforma Revenue (g)						$16,723,022
36	Adjusted Test Year Revenue (f)						$16,638,291
37	Difference						$84,731
38	Percent Difference						0.5%

APPENDIX B • Allocated Income Statement

ALLOCATED INCOME STATEMENT - PRESENT ADJUSTED

BOROUGH OF EPHRATA

Twelve Months Ending December 31, 2016

Line No.	Item	Total System	Residential	C&I General Service	General Service Total Electric	Large C&I	Large Primary Service	Security Lighting
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)
	Operating Revenues							
1	Base	$16,248,555	$7,926,719	$1,659,238	$816,886	$4,829,203	$997,009	$19,500
2	PCA	$389,736	$176,835	$33,969	$17,829	$131,176	$29,927	$0
3	Other Rate Revenue	$0	$0	$0	$0	$0	$0	$0
4	Subtotal	$16,638,291	$8,103,555	$1,693,207	$834,714	$4,960,379	$1,026,936	$19,500
5	Other Revenue	$182,044	$101,465	$18,128	$8,345	$44,722	$9,209	$175
6	Total Revenue	$16,820,335	$8,205,020	$1,711,335	$843,059	$5,005,101	$1,036,145	$19,675
	Operating Expenses							
7	Purchased Power	$8,084,998	$3,954,740	$710,374	$341,371	$2,526,697	$551,816	$0
8	Transmission	$1,856,163	$1,010,821	$172,682	$59,098	$520,936	$92,627	$0
9	Subtotal	$9,941,160	$4,965,560	$883,056	$400,469	$3,047,633	$644,443	$0
13	Distribution - Operation	$1,825,633	$1,133,209	$288,387	$88,828	$263,775	$51,433	$0
14	Distribution - Maintenance	$465,500	$293,751	$49,317	$15,650	$81,620	$16,567	$8,594
18	Administrative & General	$472,522	$227,501	$111,463	$33,998	$83,607	$15,953	$0
19	Subtotal	$2,763,655	$1,654,462	$449,167	$138,476	$429,003	$83,953	$8,594
20	Depreciation & Amortization	$0	$0	$0	$0	$0	$0	$0
21	Taxes - Property	$0	$0	$0	$0	$0	$0	$0
22	Admin Charges to the General Fund	$586,677	$282,463	$138,391	$42,212	$103,805	$19,806	$0
23	Total Debt Service	$205,000	$136,501	$21,233	$6,799	$33,637	$6,830	$0
24	Other Deductions	$25,000	$12,176	$2,544	$1,254	$7,453	$1,543	$29
27	Subtotal	$3,580,332	$2,085,602	$611,335	$188,741	$573,898	$112,133	$8,623
28	Total Expenses	$13,521,492	$7,051,163	$1,494,390	$589,210	$3,621,531	$756,575	$8,623
29	**Operating Margins**	$3,298,843	$1,153,857	$216,945	$253,850	$1,383,570	$279,569	$11,052
30	Transfers Out	($3,215,070)	($1,128,335)	($212,146)	($248,235)	($1,352,968)	($273,386)	$0
31	Non-Op Margins	$86,500	$42,129	$8,803	$4,340	$25,788	$5,339	$101
32	Total Net Margins	$170,273	$67,651	$13,601	$9,954	$56,391	$11,523	$11,153
33	**Operating Profit Margin**	**19.6%**	**14.1%**	**12.7%**	**30.1%**	**27.6%**	**27.0%**	**56.2%**
34	**Relative Operating Profit Margin**	**1.00**	**0.72**	**0.65**	**1.54**	**1.41**	**1.38**	**2.86**
35	**Net Profit Margin**	**1.0%**	**0.8%**	**0.8%**	**1.2%**	**1.1%**	**1.1%**	**56.7%**
36	**Relative Net Profit Margin**	**1.00**	**0.81**	**0.79**	**1.17**	**1.11**	**1.10**	**56.00**

ALLOCATED INCOME STATEMENT - REVISED

BOROUGH OF EPHRATA

Twelve Months Ending December 31, 2016

Line No.	Item	Total System	Residential	C&I General Service	General Service Total Electric	Large C&I	Large Primary Service	Security Lighting
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)
	Operating Revenues							
1	Base	$16,723,022	$8,147,238	$1,701,604	$839,087	$4,983,732	$1,031,862	$19,500
2	PCA	$0	$0	$0	$0	$0	$0	$0
3	Other Rate Revenue	$0	$0	$0	$0	$0	$0	$0
4	Subtotal	$16,723,022	$8,147,238	$1,701,604	$839,087	$4,983,732	$1,031,862	$19,500
5	Other Revenue	$182,044	$101,465	$18,128	$8,345	$44,722	$9,209	$175
6	Total Revenue	$16,905,066	$8,248,703	$1,719,732	$847,432	$5,028,454	$1,041,071	$19,675
	Operating Expenses							
7	Purchased Power	$8,084,998	$3,954,740	$710,374	$341,371	$2,526,697	$551,816	$0
8	Transmission	$1,856,163	$1,010,821	$172,682	$59,098	$520,936	$92,627	$0
9	Subtotal	$9,941,160	$4,965,560	$883,056	$400,469	$3,047,633	$644,443	$0
13	Distribution - Operation	$1,825,633	$1,133,209	$288,387	$88,828	$263,775	$51,433	$0
14	Distribution - Maintenance	$465,500	$293,751	$49,317	$15,650	$81,620	$16,567	$8,594
18	Administrative & General	$472,522	$227,501	$111,463	$33,998	$83,607	$15,953	$0
19	Subtotal	$2,763,655	$1,654,462	$449,167	$138,476	$429,003	$83,953	$8,594
20	Depreciation & Amortization	$0	$0	$0	$0	$0	$0	$0
21	Taxes - Property	$0	$0	$0	$0	$0	$0	$0
22	Admin Charges to the General Fund	$586,677	$282,463	$138,391	$42,212	$103,805	$19,806	$0
23	Total Debt Service	$205,000	$136,501	$21,233	$6,799	$33,637	$6,830	$0
24	Other Deductions	$25,000	$12,176	$2,544	$1,254	$7,453	$1,543	$29
27	Subtotal	$3,580,332	$2,085,602	$611,335	$188,741	$573,898	$112,133	$8,623
28	Total Expenses	$13,521,492	$7,051,163	$1,494,390	$589,210	$3,621,531	$756,575	$8,623
29	**Operating Margins**	$3,383,574	$1,197,540	$225,341	$258,222	$1,406,923	$284,496	$11,052
30	Transfers Out	($3,215,070)	($1,128,335)	($212,146)	($248,235)	($1,352,968)	($273,386)	$0
31	Non-Op Margins	$86,500	$42,129	$8,803	$4,340	$25,788	$5,339	$101
32	Total Net Margins	$255,004	$111,334	$21,998	$14,327	$79,744	$16,449	$11,153
33	**Operating Profit Margin**	**20.0%**	**14.5%**	**13.1%**	**30.5%**	**28.0%**	**27.3%**	**56.2%**
34	**Relative Operating Profit Margin**	**1.00**	**0.73**	**0.65**	**1.52**	**1.40**	**1.37**	**2.81**
35	**Net Profit Margin**	**1.5%**	**1.3%**	**1.3%**	**1.7%**	**1.6%**	**1.6%**	**56.7%**
36	**Relative Net Profit Margin**	**1.00**	**0.89**	**0.85**	**1.12**	**1.05**	**1.05**	**37.58**

APPENDIX C • Unit Cost Summary

UNIT COST SUMMARY

BOROUGH OF EPHRATA

Twelve Months Ending December 31, 2016

Line No.	Item	Total System	Residential	C&I General Service	General Service Total Electric	Large C&I	Large Primary Service
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
1	Proposed Revenue	$16,905,066	$8,248,703	$1,719,732	$847,432	$5,028,454	$1,041,071
2	**Customer Costs**	$1,767,285	$1,182,513	$361,904	$109,124	$91,940	$13,212
3	No. of Customers	6,655	5,823	597	175	58	2
4	$/Customer/Mo.		$16.92	$50.52	$51.96	$132.10	$550.48
5	**Demand Costs - Power Cost**	$3,486,263	$1,925,318	$331,379	$106,844	$940,226	$182,496
6	kWh Sales	132,063,110	62,127,983	11,273,636	6,000,283	43,065,288	9,595,920
7	kW NCP Demand	40,363	20,814	5,423	1,377	10,649	2,099
8	$/kW (Power Cost)		$7.71	$5.09	$6.46	$7.36	$7.24
9	$/kWh (Power Cost)		$0.03099	$0.02939	$0.01781	$0.02183	$0.01902
10	**Demand Costs - System Cost**	$1,877,444	$922,288	$252,786	$85,265	$512,125	$104,980
11	kWh Sales	132,063,110	62,127,983	11,273,636	6,000,283	43,065,288	9,595,920
12	kW NCP Demand	40,363	20,814	5,423	1,377	10,649	2,099
13	$/kW (System Cost)		$3.69	$3.88	$5.16	$4.01	$4.17
14	$/kWh (System Cost)		$0.01484	$0.02242	$0.01421	$0.01189	$0.01094
15	**Energy Costs**	$6,454,898	$3,040,243	$551,677	$293,625	$2,107,407	$461,946
16	kWh Sales	132,063,110	62,127,983	11,273,636	6,000,283	43,065,288	9,595,920
17	$/kWh		$0.04894	$0.04894	$0.04894	$0.04894	$0.04814
18	**Revenue Costs**	$3,150,673	$1,109,137	$208,792	$242,587	$1,322,801	$267,327
19	kWh Sales	132,063,110	62,127,983	11,273,636	6,000,283	43,065,288	9,595,920
20	$/kWh		$0.01785	$0.01852	$0.04043	$0.03072	$0.02786
21	**Total Income**	$168,504	$69,205	$13,195	$9,987	$53,955	$11,110
22	kWh Sales	132,063,110	62,127,983	11,273,636	6,000,283	43,065,288	9,595,920
23	$/kWh		$0.00111	$0.00117	$0.00166	$0.00125	$0.00116
	Average Usage						
24	kWh/Cons/Mo		889	1,574	2,857	61,875	399,830

UNBUNDLED UNIT COST SUMMARY | BOROUGH OF EPHRATA | Twelve Months Ending December 31, 2016

Line No.	Item	Total System	Residential	C&I General Service	General Service Total Electric	Large C&I	Large Primary Service
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
1	Proposed Revenue	$16,905,066	$8,248,703	$1,719,732	$847,432	$5,028,454	$1,041,071
2	**Distribution Costs**	$6,770,402	$3,201,762	$820,937	$435,722	$1,919,413	$383,975
3	No. of Customers	6,655	5,823	597	175	58	2
4	$/Customer/Mo.	$84.78	$45.82	$114.59	$207.49	$2,757.78	$15,998.97
5	**Generation Costs**	$1,630,100	$914,497	$158,697	$47,746	$419,290	$89,870
6	kWh Sales	132,063,110	62,127,983	11,273,636	6,000,283	43,065,288	9,595,920
7	kW NCP Demand	40,363	20,814	5,423	1,377	10,649	2,099
8	$/kW (Power Cost)	$3.37	$3.66	$2.44	$2.89	$3.28	$3.57
9	$/kWh (Power Cost)	$0.01234	$0.01472	$0.01408	$0.00796	$0.00974	$0.00937
10	**Transmission Costs**	$1,856,163	$1,010,821	$172,682	$59,098	$520,936	$92,627
11	kWh Sales	132,063,110	62,127,983	11,273,636	6,000,283	43,065,288	9,595,920
12	kW NCP Demand	40,363	20,814	5,423	1,377	10,649	2,099
13	$/kW (System Cost)	$3.83	$4.05	$2.65	$3.58	$4.08	$3.68
14	$/kWh (System Cost)	$0.01406	$0.01627	$0.01532	$0.00985	$0.01210	$0.00965
15	**Energy Costs**	$6,454,898	$3,040,243	$551,677	$293,625	$2,107,407	$461,946
16	kWh Sales	132,063,110	62,127,983	11,273,636	6,000,283	43,065,288	9,595,920
17	$/kWh	$0.04888	$0.04894	$0.04894	$0.04894	$0.04894	$0.04814
18	**Total Income**	$193,504	$81,381	$15,739	$11,241	$61,409	$12,653
19	kWh Sales	132,063,110	62,127,983	11,273,636	6,000,283	43,065,288	9,595,920
20	$/kWh		$0.00131	$0.00140	$0.00187	$0.00143	$0.00132
	Average Usage						
21	kWh/Cons/Mo		889	1,574	2,857	61,875	399,830

APPENDIX D • Residential Rate Comparison

Borough of Ephrata
Residential Rate, Present vs. Proposed

kWh	Present		Proposed		Difference	
Usage	Amount	Cents/kWh	Amount	Cents/kWh	Amount	Percent
(a)	(b)	(c)	(d)	(e)	(f)	(g)
0	$12.00	0.00	$14.00	0.00	$2.00	16.67%
50	$18.42	36.84	$20.34	40.68	$1.92	10.44%
100	$24.84	24.84	$26.68	26.68	$1.85	7.43%
200	$37.67	18.84	$39.36	19.68	$1.69	4.49%
300	$50.51	16.84	$52.04	17.35	$1.54	3.04%
400	$61.84	15.46	$63.22	15.81	$1.38	2.23%
500	$73.18	14.64	$74.40	14.88	$1.23	1.67%
600	$84.51	14.09	$85.58	14.26	$1.07	1.27%
700	$95.85	13.69	$96.76	13.82	$0.92	0.95%
800	$107.18	13.40	$107.94	13.49	$0.76	0.71%
900	$118.52	13.17	$119.12	13.24	$0.61	0.51%
1,000	$129.85	12.99	$130.30	13.03	$0.45	0.35%
1,100	$140.69	12.79	$140.98	12.82	$0.30	0.21%
1,250	$156.94	12.56	$157.00	12.56	$0.06	0.04%
1,500	$184.03	12.27	$183.70	12.25	($0.32)	-0.18%
1,750	$211.11	12.06	$210.40	12.02	($0.71)	-0.34%
2,000	$238.20	11.91	$237.10	11.86	($1.10)	-0.46%
2,500	$292.38	11.70	$290.50	11.62	($1.88)	-0.64%
3,000	$346.55	11.55	$343.90	11.46	($2.65)	-0.76%
3,500	$400.73	11.45	$397.30	11.35	($3.43)	-0.85%
4,000	$454.90	11.37	$450.70	11.27	($4.20)	-0.92%

Note: Present dollar amounts include adjustment factor per kWh of $0.002850
Revised dollar amounts include adjustment factor per kWh of $0.000000

Borough of Ephrata
Residential Rate, Revised Rates vs. PPL

kWh	PPL Rates		Revised Rates		Difference	
Usage	Amount	Cents/kWh	Amount	Cents/kWh	Amount	Percent
(a)	(b)	(c)	(d)	(e)	(f)	(g)
0	$16.11	0.00	$14.00	0.00	($2.11)	-13.07%
50	$21.69	43.37	$20.34	40.68	($1.35)	-6.21%
100	$27.27	27.27	$26.68	26.68	($0.59)	-2.15%
200	$38.43	19.21	$39.36	19.68	$0.93	2.43%
300	$49.59	16.53	$52.04	17.35	$2.45	4.94%
400	$60.75	15.19	$63.22	15.81	$2.47	4.07%
500	$71.91	14.38	$74.40	14.88	$2.49	3.46%
600	$83.07	13.85	$85.58	14.26	$2.51	3.02%
700	$94.23	13.46	$96.76	13.82	$2.53	2.68%
800	$105.39	13.17	$107.94	13.49	$2.55	2.41%
900	$116.56	12.95	$119.12	13.24	$2.56	2.20%
1,000	$127.72	12.77	$130.30	13.03	$2.58	2.02%
1,100	$138.88	12.63	$140.98	12.82	$2.10	1.51%
1,250	$155.62	12.45	$157.00	12.56	$1.38	0.89%
1,500	$183.52	12.23	$183.70	12.25	$0.18	0.10%
1,750	$211.43	12.08	$210.40	12.02	($1.03)	-0.49%
2,000	$239.33	11.97	$237.10	11.86	($2.23)	-0.93%
2,500	$295.13	11.81	$290.50	11.62	($4.63)	-1.57%
3,000	$350.94	11.70	$343.90	11.46	($7.04)	-2.01%
3,500	$406.75	11.62	$397.30	11.35	($9.45)	-2.32%
4,000	$462.55	11.56	$450.70	11.27	($11.85)	-2.56%

Note: PPL Rates dollar amounts include adjustment factors as listed in PPL tariffs
Revised Rates dollar amounts include adjustment factor per kWh of $0.000000

APPENDIX E • Power Cost Adjustment Base Calculation

BOROUGH OF EPHRATA
POWER COST ADJUSTMENT
DETERMINATION OF "BASE POWER SUPPLY COST"

Line	Resource	2019 Adjusted	Comment
(a)	(b)	(c)	(d)
	Energy		
1	NYPA	$78,827	All costs reflect
2	AFEC	$648,159	2019 Adjusted
3	Blue Creek	$34,075	Test Year
4	Solar	$333,224	
5	Market	$363,817	
6	Blocks	$4,845,925	
7	*2x16 PPL*	$405,525	
8	*5x16 PPL*	$367,551	
9	*7x24 PPL*	$0	
10	*7x8 PPL*	$690,596	
11	*MS Western Hub 2 MW*	$710,962	
12	*EDF Western Hub 3.7 MW*	$0	
13	*Next Era*	$783,074	
14	*7x24 Exelon*	$1,888,218	
15	**Subtotal - Energy**	**$6,304,027**	
	Demand		
16	NYPA	$75,634	
17	AFEC	$505,415	
18	Transmission	$1,856,163	
19	Capacity	$1,268,320	
20	Capacity Credits	($219,269)	
21	**Subtotal - Demand**	**$3,486,263**	
22	Congestion	($139,612)	
23	Ancillary Services	$92,597	
24	Service Fees - Energy	$167,288	
25	Service Fees - Fixed	$30,597	
26	**Subtotal - Other**	**$150,871**	
27	**AMP 2020 Peaking Resource**	**$0**	Funded Through Cash
28	**Total Power Cost**	**$9,941,160**	
29	Metered Sales to Customers	132,063,110	2016 Test Year
30	Metered Usage - Borough Facilities	1,841,295	2019 PCA Budget
31	Estimated Street and Security Lights	1,200,000	2019 PCA Budget
32	**Total Test Year Energy Sales (kWh)**	135,104,405	
33	**Base Power Supply Cost**	**$0.07358 $/kWh**	