2017

Financial Benchmarking for Rural Alaska Electric Utilities

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I. Executive Summary

Rural Alaska electric utilities are unique creations in the world of power generation. Most operate small, islanded grids that serve populations that number from dozens to several thousand. The average population served is just under 1,000. These utilities generally have a high dependence on expensive diesel generation and in most cases they rely on Power Cost Equalization (PCE), a State subsidy that pays down the cost of power for residential consumers and community facilities. Many have also historically received assistance in purchasing generators and other assets. These communities are at a crossroads, however, as state grant funding is drying up. This may force rural utilities to borrow more money for capital needs. But do they have the financial capacity to take on debt?

This study by the University of Alaska Center for Economic Development attempts to characterize the financial health of Rural Alaska electric utilities, and set forth a framework to assess the health and needs of these organizations. Its methods and findings are summarized here.

Methods used in this analysis include:

- **Financial analysis of Rural Alaska electric utilities** based on Annual Reports including income statements and balance sheets, filed with the Regulatory Commission of Alaska (RCA).
- **Computing benchmarks** based on Annual Reports filed with the RCA and PCE statistical reports.
- An online and telephonic **survey of Rural Alaska electric utility managers**.
- **Creation of a taxonomy of rural electric utilities**: micro-single, small-single, hub community, and multi-community utilities, based on population and generation levels, and operation of more than one grid.

Major findings from this report include:

- Most alarmingly, a large number of utilities (especially the micro-single and small-single utilities) report expenses that exceed revenues, raising concerns about their financial solvency.
- Multi-community utilities, which operate multiple islanded grids but share a common administration, were difficult to evaluate as a group. They represented wide variations in financial and operational performance. For example, the generation unit cost for this diverse category ranged from $.28 to $1.56.
- Predictably, hub communities had the strongest financial outlook in terms of revenue and cost structure, while micro-single utilities had the weakest, with small-single utilities in between. The same pattern repeated itself with generation efficiency metrics, with micro-single communities showing the weakest benchmarks.
- Utility managers themselves report needing assistance with financial management as well as technical matters and regulatory compliance.

II. Introduction

Rural Alaska electric utilities pay some of the highest power generation costs in the nation.[1] Dependence on diesel fuel and islanded generation (i.e. no interties between rural and urban communities) leaves the state's rural electric utilities with few apparent options to lower costs. Furthermore, many of these utilities serve a single small community with a very small population, so they cannot leverage administrative efficiencies or economies of scale. This stands in contrast to large power utilities in the Lower 48 that serve customer bases in the millions, and can easily afford the overhead costs to manage and maintain utility assets and operations.

The utilities included in this benchmarking study are all eligible for the PCE program, which is administered by the Alaska Energy Authority (AEA), and exists to reduce power costs to consumers in rural areas. For households and other eligible entities, PCE pays down the cost of power to a rate closer to that of urban Alaska. This study began with the intent to gather data from Annual Reports filed with the RCA from 2013 to 2016, for all of the utilities in the PCE program. As of June 2016, 88 utilities were eligible for PCE.[2] It is common for utilities to be missing one, or several annual reports , or have annual reports so lacking in data they were excluded from the study. Eighty utilities had enough reported data to be included in this analysis.

As the subsequent literature review shows, lowering the cost of delivered power to rural residents has been a longstanding policy priority in Alaska, and a primary concern for AEA. In addition to relieving the burden on rural households, AEA also sees a need to evaluate and bolster the organizational and financial capacity of these utilities. The current fiscal environment for state government, driven by dramatic declines in petroleum revenues, means that state funding to replace failing generators and perform utility maintenance and repairs, faces an uncertain future. Rural electric utilities unable to access debt financing for replacement may be left in a precarious situation.

While concerns about consumer costs, maintenance funding, and organizational capacity have surfaced numerous times in recent decades, in various studies, three important information gaps have remained unfilled:

- An examination of utility financial health in terms of revenue and expense structure, liquidity, and operational efficiency.
- A set of benchmarks or norms, by which utilities may measure their performance.
- The specific needs identified by the utilities themselves, in terms of benchmarking, operational challenges, and areas of assistance.

The current study represents an effort to fill these gaps by relying on an underutilized source of financial data: *Annual Power Cost Equalization Reports for Nonregulated Utilities* (hereafter called "Annual Reports") filed with the RCA, which include balance sheets and income statements for each utility. In many cases, this financial information could also be cross-referenced with *Annual PCE Statistical Reports* ("Statistical Reports") generated by AEA, providing an additional layer of statistics on fuel costs,

[1] Source: Shaw, D. W. (2017, March 27). What Rural Alaska Can Teach the World about Renewable Energy. Scientific American. doi:https://www.scientificamerican.com/article/what-rural-alaska-can-teach-the-world-about-renewable-energy/

[2] Source: Alaska Energy Authority. (2017, February). Power Cost Equalization Program Statistical Data by Community: Reporting Period July1, 2015 to June 30, 2016. doi: http://www.akenergyauthority.org/Portals/0/DNNGalleryPro/uploads/2017/2/28/FY16PCEAnnualCommunity.pdf

generation levels, and other key information. In collecting and analyzing this data, this effort attempts to answer the following questions:

- **How should rural electric utilities be categorized to offer meaningful comparisons?** Some utilities serve dozens of residents, and some thousands, and represent wide diversity in terms of geographic factors and generation amounts.
- **Do utilities collect enough revenue to meet their expenses?**
- **What are the major expenses utilities face, and how do the expense structures compare between utilities?**
- **How dependent are utilities on PCE revenue?**
- **How efficient are utilities in generating power with the resources provided?** This includes fuel, labor, and other inputs.
- **Do utilities exhibit much capacity to obtain and repay debt financing?**
- **What types of measures do rural utility managers consider important or useful?**
- **What kinds of assistance do utility managers say they need?**

Lastly, some caution is in order in defining benchmarks for each indicator. Data quality is inconsistent in many cases, and while some indicators point to operational effectiveness, many reflect factors like fuel costs that are outside of the utilities' control. Rather than being a "stick" to measure management performance, benchmarks should be a tool to help utilities identify areas in which improved efficiency or effectiveness is possible.

III. Problem Statement

Currently, there are large gaps in the financial data for rural electric utilities. The lack of information leads to difficulties when discussing cost saving suggestions for these utilities, which are saddled with some of the nation's highest energy costs. As a way to counter this issue, this study set out to examine how information can be used to produce better management of the utilities. It also aims to identify the indicators and tools that are most important to tracking progress, with the goal of better financial and operational management of electric utilities. Finally, this report identifies challenges rural utility managers face in providing good utility management.

Figure 1: A diesel power plant in the village of Chefornak.
Source: Photo Credit: Department of Commerce, Community and Economic Development; Division of Community and Regional Affairs' Community Photo Library.

IV. Literature Review

This report builds on the research from the first phase of the utility cost management strategies project. However, it delves much deeper into the development of utility indicators and baselines, in an effort to determine cost saving strategies and possible management tools for rural electric utilities. The methodology for this report was influenced by other research done on rural electric utilities including:

- *Alaska Affordable Energy Strategy (Neil McMahon, AEA)*[3]
- *Determinants of the Cost of Electricity Service in PCE eligible communities (Mark Foster & Institute of Social and Economic Research (ISER)*[4]
- *Sustainable Energy Solutions for Rural Alaska (Regulatory Assistance Project)*[5]
- *True Cost of Electricity in Rural Alaska (Steve Colt & ISER)* [6]

Alaska Affordable Energy Strategy:

The Alaska Affordable Energy Strategy (AkAES) provided numerous recommendations for reducing the cost of energy in rural communities. Part of the recommendations focused on improving the data collection, and quality, done by rural electric utilities. This utility cost management report assists with that recommendation by building a methodology for creating indicators and baselines using publicly available electric utility data. According to AkAES, data collected by and for electric utilities should meet standard requirements, to ensure the data is readily available and useable.

AkAES stressed the importance of using data collected on the utilities, to ensure they still met the minimum standards needed to qualify for a Certificate of Public Convenience Use and Necessity (CPCN). Essentially, the utilities must be "fit, willing, and able", to show they are still in good enough condition to be running the utility. For example, the utility should have no delinquent PCE paperwork, have well-maintained systems, as little interruptions of service as possible, etc. By measuring how each utility fares in regards to the baseline established for the category they are in, it is possible to determine how well maintained, and run the utility is. The baselines could also flag areas for improvement, such as the need for assistance with completing financials to ensure they are an accurate representation of the utilities' financial state.

Determinants of the Cost of Electricity Service in PCE eligible communities:

The *Determinants of the Cost of Electricity Service,* was an analysis done by Mark Foster and ISER, for AEA. It examined the cost drivers of electricity services. The report also notes the importance of collecting information on system reliability, such as the number of yearly break downs, which is currently not being consistently reported.

The report examined, in depth, the amount and type of subsidies given to utilities throughout Alaska. While there was not perfect information on all of the subsidies utilities receive, the report looked at how effective the subsidies were at lowering electric rates. Subsidies are given to lower electric rates, and therefore act, in many cases, as a poverty reduction tool.

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[3] Source: http://www.akenergyauthority.org/Policy-Planning/AlaskaAffordableEnergyStrategy
[4] Source: http://www.iser.uaa.alaska.edu/Publications/2017_01_20-DeterminantsCostElectricityServicePCEEligibleComms.pdf
[5] Source: http://www.raponline.org/knowledge-center/sustainable-energy-solutions-for-rural-alaska/
[6] Source: http://www.iser.uaa.alaska.edu/Publications/2016_10_26-TrueCostElectricityFuelRuralAK.pdf

Interestingly, this report states that energy subsidies are actually quite inefficient at poverty reduction, with only 10%, approximately, of the subsidy actually going to the family. It seems that if there is a significant amount of money going out in the form of subsidies, and that it might not be focusing on the right issues in order to lower energy rates. “Subsidies allow inefficient producers to avoid consumer criticism, because subsidies hide the inefficiency” (pg. 24). Additionally, the study points out how postage stamp rates are problematic. They use those with cheaper energy to subsidize those with more expensive energy. They potentially de-incentivize power saving practices.

Finally, the report examined the savings that could be achieved if the smaller utilities joined larger regional Investor Owned Utilities (IOUs) or cooperatives (co-ops). While there is some analysis in this report that seems to illustrate the potential cost savings, there are issues of political feasibility presented as well. Finally, this report discusses the need for best practices in management of utilities, and how additional regulations could be put in place to ensure that utilities to are using those best practices.

Sustainable Energy Solutions for Rural Alaska:

The *Sustainable Energy Solutions for Rural Alaska* report was crafted to be the “backbone” of a 10-year energy plan, and suggested recommendations for policy makers in regards to implementing and/or sustaining renewable energy in Alaska. The Regulatory Assistance Project was looking at the “current state” of energy in rural Alaska, and finding cost effective solutions. Based on the framework they established; it seems to have been written from a policy perspective. The report created a tiered matrix classification system, where utilities were classified as having: underperforming systems, basic systems, advanced diesel systems, or leading and innovating systems. The utilities were divided into those categories based on the following criteria: reliability, capital planning, strategic planning, management, workforce development, governance, financial performances, and system efficiency.

The overall recommendations included: encourage economies of scale in electricity production, align reporting with financial incentives, allow in third party people, and strengthen workforce development. Furthermore, the study advocated for regional energy plans, and capital planning.

True Cost of Electricity in Rural Alaska:

Steve Colt at ISER authored, and Mark Foster prepared, the “True Cost of Electricity in Rural Alaska” study, which examined electricity costs for rural communities. Part of the data focused on reporting all of the subsidies utilities receive, and attempting to parse out information that would indicate the type and costs of capital projects in particular communities. This report highlighted the large data issues with Annual Reports filed with the RCA. They noted that the data does not seem to be consistently reported. The report makes the following point:

> The basic challenge in determining total or “true” nonfuel costs is that some costs are not booked, while other costs get removed by RCA when determining PCE reimbursement rates. Utilities have no incentive to put contributed plant on their books because it will just get removed by RCA, and RCA has no incentive to enforce complete bookkeeping when they are not concerned with grant-funded plant or returns to invested capital.[7]

[7] Source: Steve Colt. (2016, October 26). The True Cost of Electricity in Rural Alaska. IESR. doi: http://www.iser.uaa.alaska.edu/Publications/2016_10_26-TrueCostElectricityFuelRuralAK.pdf

Colt also mentions that the RCA do not disallow utilities from co-mingling funds. Many rural electric utilities are run by municipalities, tribes, or other entities that might be managing multiple funding sources. When electric utility funds are co-mingled with other funds, it becomes more difficult to accurately track financial information, like utility specific revenues and expenses.

V. Methods

Data for this project was collected directly from the Annual Reports filed with the RCA. These records, unlike most other data sources, are free from analysis. In a few instances when pertinent data was not available from the RCA Annual Reports, but available from another data set such as the PCE statistical records on the AEA website, data was substituted from the secondary data source.

A. Taxonomy of Utilities

To generate meaningful comparisons, the PCE-eligible utilities were divided into four categories based on: community population, annual power generation, and whether they serve a single community or multiple communities. Although considerable variation exists in terms of financial and operational characteristics, utilities within each group broadly resemble one another on a host of measures as this analysis will show.[8] The four categories are described in the table below:

Category Name	Average Population	Definition
Micro-Single Utilities	**268**	• Serve a single community with *less than* 2,000 residents
		• Generated <u>*less than*</u> 500,000 kWh in 2015
		• Utility operates one islanded grid
Small-Single Utilities	**932**	• Serve a single community with *less than* 2,000 residents
		• Generated <u>*greater than*</u> 500,000 kWh in 2015
		• Utility operates one islanded grid
Hub Community Utilities	**2,414**	• Primarily serve a single community with a population between 2,000 and 7,000
		• No set annual power generation level
		• Utility operates one islanded grid
Multi-Community Utilities	**4,236**	• Serving multiple (often islanded) PCE-eligible communities of any size
		• No set population size
		• No set annual power generation level

Table 1: Taxonomy of Utilities

[8] Note: The population limit for micro-single and small-single is in part based on the Rural Power System Upgrade (RPSU) program population limit of 2,000 residents. Please see 3 AAC 108.210 (Eligibility and selection for circuit rider assistance) for further details.

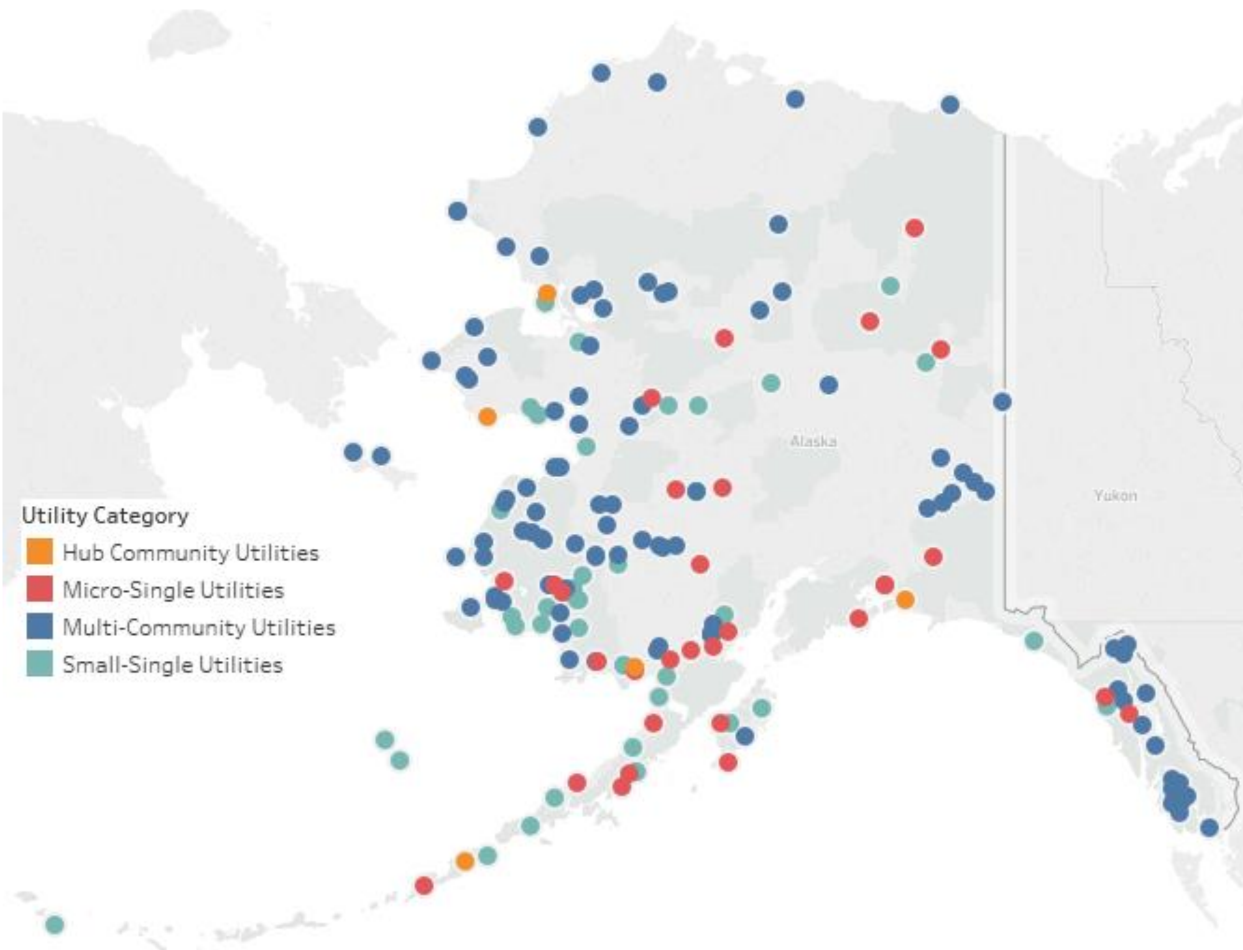

Figure 2: PCE Communities By Category

Micro-Single Utilities:

These utilities serve a single community with less than 2,000 residents, and generate less than 500,000 kWh per year (2015 is the base year). Micro-single utilities in most cases have populations of less than 400 residents and face some of the highest power costs in the state. The average micro-single utility generated about 320,000 kWh in 2015, and charged an effective residential rate of $.37 per kWh. With some exceptions, micro-single utilities host fewer commercial or industrial ratepayers. This category includes the power utilities of the following communities:

- Akhiok
- Arctic Village
- Atmautluak
- Beaver
- Chenega
- Chignik Lake
- Chitina
- Circle
- Clarks Point
- Elfin Cove
- Hughes
- Igiugig
- Karluk
- Kokhanok
- Koyukuk
- Levelock
- Lime Village
- Napakiak
- Nelson Lagoon
- Nikolai
- Pedro Bay
- Perryville
- Pilot Point
- Takotna
- Tatitlek
- Tenakee Springs
- Twin Hills
- Umnak
- Newtok (Ungusraq)

Measure	Average for Micro-Single Utilities, 2015
kWh Generated/Year	319,930 kWh
Residential Rate (pre-PCE)	$.85
PCE Subsidy Level	$.48
Effective Residential Rate	$.37
Annual Utility Expenditure	$236,681

Table 2: Average statistics for Micro-Single Utilities, 2015

Small-Single Utilities:

Small-single utilities provide power for a single community with less than 2,000 residents, generating in excess of 500,000 kWh per year as of 2015. On average, the communities they serve have slightly larger populations than the micro-single utilities, and in some cases provide power to industrial ratepayers such as seafood processing plants. Residential ratepayers of small-single utilities pay less than those of the micro-single utilities, potentially indicating economies of scale associated with higher levels of generation. Annual utility expenditures are more than double those of the smaller utilities as well. Communities in the small-single category are listed below:

- Akiachak
- Akiak
- Akutan
- Aniak
- Atka
- Buckland
- Central (Gold Country Energy)
- Chignik
- Chignik Lagoon
- Deering
- Egegik
- False Pass
- Galena
- Golovin
- King Cove
- Kipnuk
- Kwethluk
- Kwigillingok
- Larsen Bay
- Manokotak
- McGrath
- Naknek
- Napaskiak
- Chefornak (Naterkaq)
- Nunam Iqua
- Ouzinkie
- Pelican
- Port Heiden
- Puvurnaq
- Ruby
- Saint George
- Saint Paul
- Port Alsworth (Tanalian)
- Tanana
- Tuluksak
- Tuntutuliak
- Unalakleet
- Venetie
- White Mountain
- Yakutat

Measure	Average for Small-Single Utilities, 2015
kWh Generated/Year (median)[9]	1,037,637 kWh
Residential Rate (pre-PCE)	$.64
PCE Subsidy Level	$.35
Effective Residential Rate	$.29
Annual Utility Expenditure	$857,170

Table 3: Average statistics for Small-Single Utilities, 2015

Hub Community Utilities

Electric utilities serving the largest PCE-eligible communities in Alaska, with populations between 2,000 and 7,000, form the hub community utilities category. This category consists of those utilities that solely or primarily provide power to a single large (by rural Alaska standards) community with one islanded grid. Communities in this size category served by a multi-community utility—such as Bethel—are classified separately. In most cases these communities serve as the administrative and transportation centers for multiple smaller communities, hence the "hub" designation.[10]

Because hub communities usually host health care facilities, government offices, and private employers, a significant portion of their ratepayer base is not residential. These communities also pay some of the lowest costs of all PCE-eligible communities, with an average effective residential rate of $.22 per kWh. Hub community utilities include:

- Cordova
- Kotzebue
- Nome
- Dillingham (Nushagak Co-op)
- Unalaska

Measure	Average for Hub Community Utilities, 2015
kWh Generated/Year	28,563,482 kWh
Residential Rate (pre-PCE)	$.42
PCE Subsidy Level	$.20
Effective Residential Rate	$.22
Annual Utility Expenditure	$10,253,376

Table 4: Average statistics for Hub Community Utilities, 2015

Multi-Community utilities

Most of the communities of Rural Alaska have their own power utility, serving only a single community—the basis of the first three categories. Utilities serving multiple islanded PCE-eligible communities (regardless of population size) make up the final category, multi-community utilities. They may serve as few as five communities (Middle Kuskokwim and IPEC), to over 50 (AVEC). These utilities share administrative and maintenance functions, potentially generating efficiencies. In addition, half of the utilities in this category (APC, INN, IPEC) serve multi-community grids where at least two

[9] Note: For small-single utility annual power generation, the median value is used rather than the average. This is due to Naknek being an outlier as it generated nearly 22 million kWh in 2015, about three times more power production than the second highest utility.

[10] Note: Cordova does not necessarily fit the "hub" label, but it met the population parameters and is served by a community-specific utility, which is why it is included in this category.

communities are connected through transmission lines. The other three utilities serve multiple communities with islanded systems.

These utilities run a large spectrum in terms of size; in 2015 AVEC produced over 120 million kWh in 55 communities, while Middle Kuskokwim generated less than 1 million kWh. On average, multi-community utilities generate a similar level of power to hub-communities, and pay similar effective residential rates. If the North Slope Borough (which subsidizes power costs from its general funds) is removed, the average residential rate (pre-PCE) is almost $.20 higher than the comparable rate for hub communities ($.61 versus $.42).

- Alaska Power Company (APC)
- Alaska Village Electric Cooperative (AVEC)
- Illiamna Newhalen Nondalton (INN)
- Inside Passage Electric Cooperative (IPEC)
- Middle Kuskokwim Electric
- North Slope Borough Power and Light

Measure	Average for Multi-Community Utilities, 2015
kWh Generated/Year	29,480,363 kWh
Residential Rate (pre-PCE)	$.53
PCE Subsidy Level	$.29
Effective Residential Rate	$.24
Annual Utility Expenditure	$17,182,450

Table 5: Average statistics for Multi-Community Utilities, 2015

B. Indicator Analysis

Utilizing the methods and information sources described above, this analysis calculated metrics for three broad categories: revenues and expenses, operational efficiency, and financial capacity. For each indicator, the following method was used:

1. Indicators were calculated for all utilities and all available years from 2013 to 2016, according to defined formulas explained in this section.
2. Indicator values were averaged for all years for each utility. The average was used to smooth the variability in some metrics from year to year, for a given utility.
3. A median value was calculated for each indicator by utility category—micro-single, small-single, hub community, or multi-community. The median was used to reduce the skew of outlier communities with unusually low or high values.
4. The median value for each category—reflecting multiple years of data for numerous communities—is reported and compared in simple bar graphs. Detailed results can be found in the Appendix.

C. Meta Data

The main source of information for this report was the Annual Power Cost Equalization Report for Nonregulated Utilities (Annual Report), which includes the financial and supplemental forms submitted to the RCA by individual utilities. This data source was chosen because it was free from previous analysis. However, on numerous occasions the Annual Reports submitted to the RCA, by the utilities, lacked basic information. For example, utilities often would submit an Annual Report with blank financial forms, but attach separate trial balances, or statement of cash flows. Data was also retrieved from the PCE Statistical Reports (Statistical Reports), found on the AEA website. In addition to Annual Reports, 8 of the utilities included in this analysis are required to file forms annually with the Federal Energy Regulatory Commission (FERC). The RCA considers the FERC forms to be an acceptable format for the Annual Report, and so those 8 utilities submit the same forms to FERC as they do to the RCA. For the purposes of this report they will be referred to as FERC style forms. All of the data collected for this analysis is described in detail in the appendix. Unless otherwise noted, the data came directly from the Annual Reports filed with the RCA by each respective utility.

D. Survey Methods

A study of rural utility managers was included in this project. The goal of the survey was to further investigate what indicators were important to evaluate, as well as to get feedback on realistic benchmarks for financial and non-fuel indicators.

Utility managers for all the utilities included in this analysis were sent an email with a link to the survey, to be completed through an online interface. The email was sent multiple times to ensure the highest rate of participation. Survey participation was incentivized through the use of gift cards. Utility managers who completed the survey were sent a $5 Amazon gift card.

Figure 3: A power plant and fuel tanks in the village of Ruby.
Photo Credit: Department of Commerce, Community and Economic Development; Division of Community and Regional Affairs' Community Photo Library.

The contact information for each respondent was entered into a spreadsheet, where each respondent was given a number. Once a particular respondent submitted their responses (which included their email), the research team was notified. The survey was open for approximately four weeks, and 13 utilities responded, as summarized below.

Survey Respondents	Count
Micro-Single Utilities	6
Small-Single Utilities	6
Multi-Community Utilities	1
Hub Community Utilities	0
Total Respondents	**13**

Table 6: Survey Respondents by utility category

VI. Indicator Analysis

Central to this report is the development of a set of benchmarks, based on currently available data from the Annual Reports and Statistical Reports. This section shows the results of the analysis using methods described in the previous section. Median values for each utility category are discussed here, with full results for all utilities reserved for the Appendix. The table below lists the indicators used in this analysis, and the aspects of utility performance they attempt to gauge.

Type of Measure	Indicator	What it means
Revenues and Expenses	Net Margin	Is the utility covering its own expenses, or losing money?
	PCE as Percent of Revenue	How dependent is the utility on PCE?
	Expenses as Percent of Revenue	What are the expense drivers for the utility, and are they abnormally low or high compared to others?
Operational Efficiency	Generation Unit Cost	What is the total cost of generating a kWh, accounting for all expenses?
	Operating Expenses per kWh	What are the direct costs to produce a kWh?
	Annual kWh Produced (PCE Eligible) per Household and Community Facility	Is the utility's production high or low compared to the number of residents?
	Generator Efficiency	How many kWhs are being generated per gallon?
	Line Loss	Is power being lost?
	Payroll Expenditure per kWh	Is generation high or low for the payroll expenditures?
Financial Capacity	Debt to Equity Ratio	Does the utility have a high or low level of debt?
	Accounts Receivable Days	Does the utility collect from customers efficiently?

Table 7: Overview of indicators analyzed in this report

Limitations

In analyzing utilities via these indicators, several caveats should be noted. First, the Annual Reports submitted to the RCA are not always audited, and in many cases do not appear to be compiled by professional accountants. This means the accounting practices used by utility managers are not always consistent between utilities, or from one year to the next. The quality of the bookkeeping is also uncertain, as some communities file multiple revisions to their Annual Reports. Compliance issues sometimes result in utilities becoming ineligible for PCE, casting further doubt on the numbers. In some cases, numbers reported lie so far outside of averages that they appear suspect, such as expenses that exceed revenues several times over.

Additionally, not all indicators should be used to judge the quality of utility management. For many utilities, the numbers reflect inputs like fuel costs or equipment limitations that do not reflect the aptitude of the staff operating the utility. The purpose of defining benchmarks is not simply to judge whether a utility is "good" or "bad," but to flag areas where assistance might be needed, and provide measurement tools to guide utility managers as they seek operational improvements. The usefulness of each indicator will vary greatly, and the conclusion that follows this indicator analysis will make recommendations about which indicators to use, and how they should be viewed.


Figure 4: The interior of a power plant in the village of St. Paul in the Pribilof Islands.
Source: Photo Credit: Department of Commerce, Community and Economic Development; Division of Community and Regional Affairs' Community Photo Library.

A. Revenues and Expenses

Net Margins

Among for-profit businesses, net profit is a key success metric, the “bottom line” figure. Most rural power utilities are organized under tribes, cooperatives, local government, or other not-for-profit entities. Their objective is to provide power at the lowest possible cost, but not necessarily to earn revenue in excess of expenses. Still, a utility that loses money each year may be a liability for the community, and may be unattractive to lenders. The net revenue margin discussed here is the equivalent of a profit margin, which expresses the difference between revenues and expenses as a percentage.

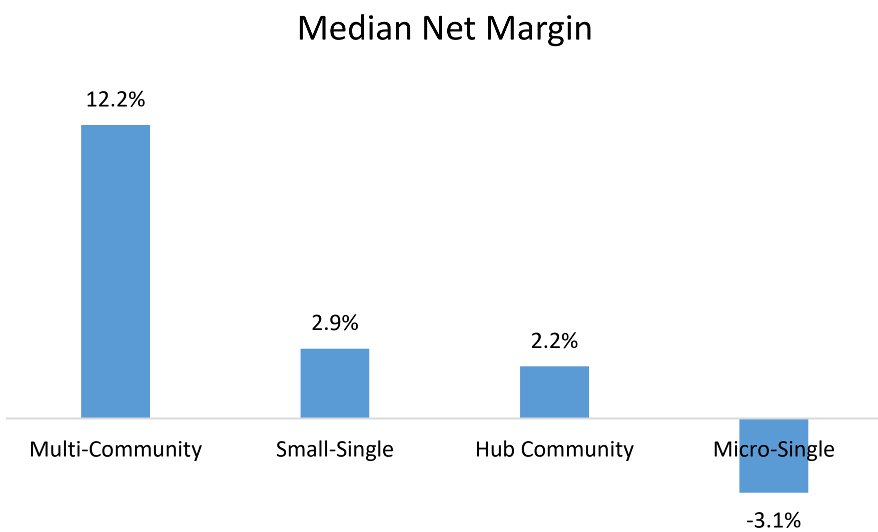

Figure 5: Median Net Margin (2013-2016)

Micro-Single Utilities	Net Margin
Min	-419.0%
25th Percentile	-23.5%
Median	-3.1%
75th Percentile	10.7%
Max	40.0%

Small-Single Utilities	Net Margin
Min	-65.2%
25th Percentile	-8.0%
Median	2.9%
75th Percentile	16.4%
Max	65.7%

Table 8: Micro-Single and Small-Single Utilities, Net Margin Quartiles

How to Calculate

(Gross Revenue-Total Expenditure)/Gross Revenue

Data Source

The revenue and expenses are taken from the Annual Reports, or the FERC style forms.

Discussion

A large share of small-single and micro-single utilities show negative net margins, which may be due to some accounting oddities (or mistakes). Whether they are an oddity or an accounting mistake, they are a cause for some concern. A majority of the micro-single utilities have negative net margins, along with almost half of the small-single utilities. Most hub and multi-community utilities had positive margins, with some exceptions. Communities with negative net margins are likely in need of technical assistance to improve their operations and administration. Setting rates too low to cover all costs is a potential culprit.

PCE Payments as a Percent of Revenues

PCE payments ease the cost of power to rural households and community facilities, and are also an important component of utility revenues. In many cases, utilities do not distinguish PCE revenue from rates collected. This analysis will therefore compare gross revenues from the Annual Reports, and PCE payments as reported by AEA in the utility Statistical Reports.

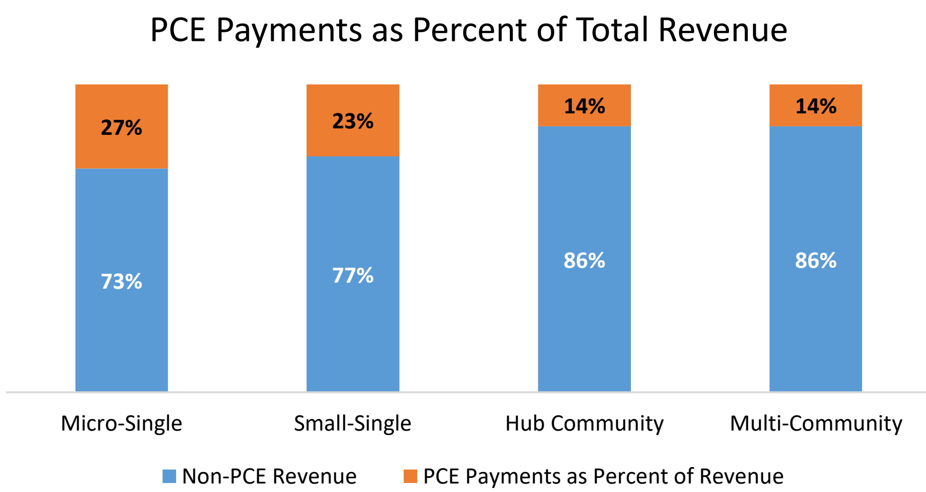

Figure 6: PCE Payments as a Percent of Total Revenue (2013-2016)

Micro-Single Utilities	Gross Revenue
Min	11.6%
25th Percentile	22.9%
Median	27.3%
75th Percentile	37.3%
Max	77.2%

Small-Single Utilities	Gross Revenue
Min	4.1%
25th Percentile	17.6%
Median	23.4%
75th Percentile	27.7%
Max	42.9%

Table 9: Micro-Single and Small-Single Utilities, PCE Payments as a % of Total Revenue Quartiles

How to Calculate

Annual PCE Payments/Gross Revenue

Data Source

PCE payments are from the Statistical Reports, revenue is from the Annual Reports.

Discussion

Unsurprisingly, hub and multi-community utilities are the least dependent on PCE revenue. This is likely due to a combination of factors. Hub community utilities sell a greater share of their power to non-households and eligible community facilities, and as a result a greater share of their output falls outside of PCE eligibility. The median percentages for multi-community utilities are skewed by some unique circumstances; Alaska Power Company generates a large share of its power from less expensive hydroelectric sources, and the North Slope Borough subsidizes power costs to households, which reduces the PCE level it can receive.

This metric illustrates the importance of PCE to the smallest communities, who would face insolvency or shift costs to households and community facilities without the state funds. In some cases, it may also be a signal of accounting irregularities if utilities record an usually large or small share of their revenue as PCE.

Expense Breakdown

To better understand the expense structure of rural utilities, this analysis computed averages for the three primary expense groupings listed in the Annual Reports: general and administrative (G&A), personnel, and operating. Operating expenses are by far the largest, as this category is composed primarily of fuel costs. G&A includes contractual costs, insurance, and (non-personnel) administrative costs. Personnel costs include compensation, payroll taxes, and workers' compensation. Because of the importance of fuel costs as a driver of operating expenses, fuel expenditures from the Statistical Reports are also broken out separately.

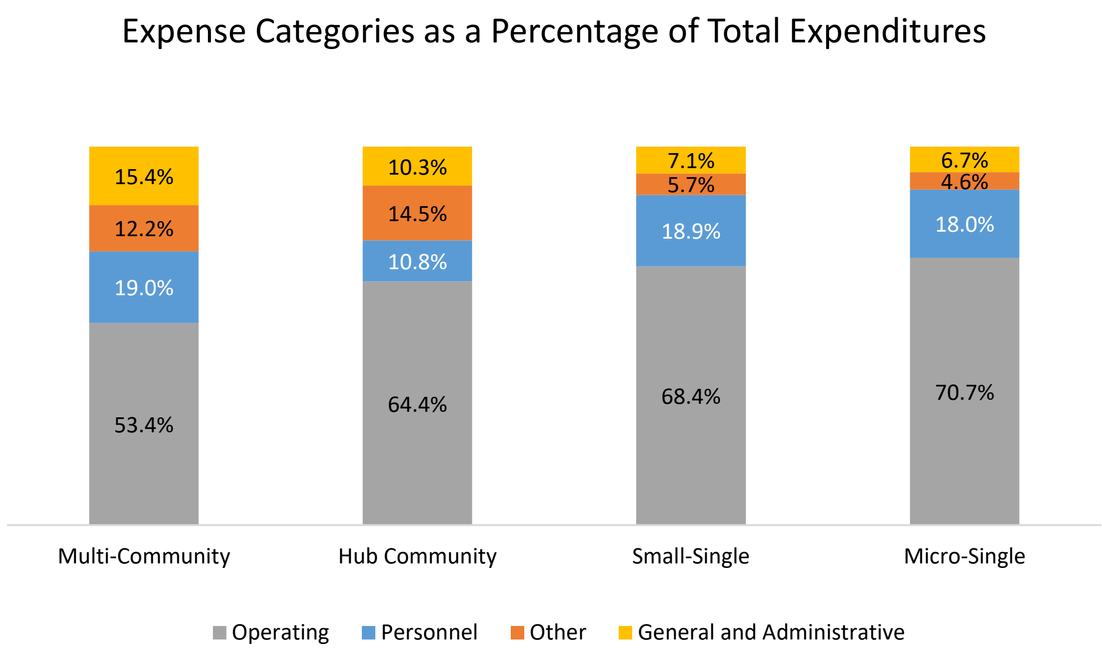

Figure 7: Expense Categories as a Percentage of Total Expenditure (2013-2016)

Micro-Single Utilities	Operating Expense %	Personnel Expense %	G&A Expense %
Min	0.2%	7.2%	55.2%
25th percentile	3.2%	12.2%	66.2%
Median	6.7%	18.0%	70.7%
75th Percentile	10.1%	26.8%	78.9%
Max	27.1%	40.2%	86.9%

Small-Single Utilities	Operating Expense %	Personnel Expense %	G&A Expense%
Min	1.8%	0.7%	25.4%
25th percentile	5.5%	11.6%	60.5%
Median	7.1%	18.9%	68.0%
75th Percentile	12.4%	25.3%	77.7%
Max	38.2%	49.9%	92.6%

Table 10: Micro-Single and Small-Single Utilities, Expense Quartiles

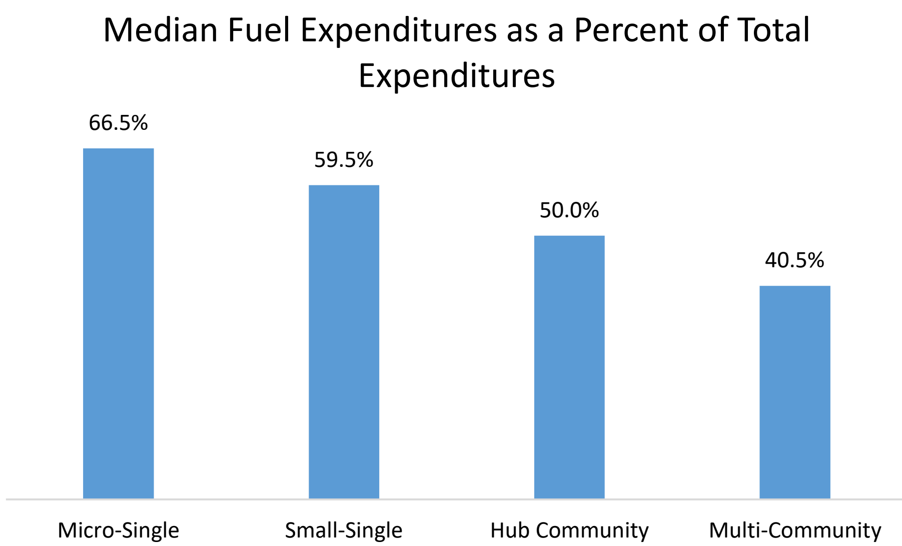

Figure 8: Median Fuel Expenditures as a Percent of Total Expenditures (2013-2016)

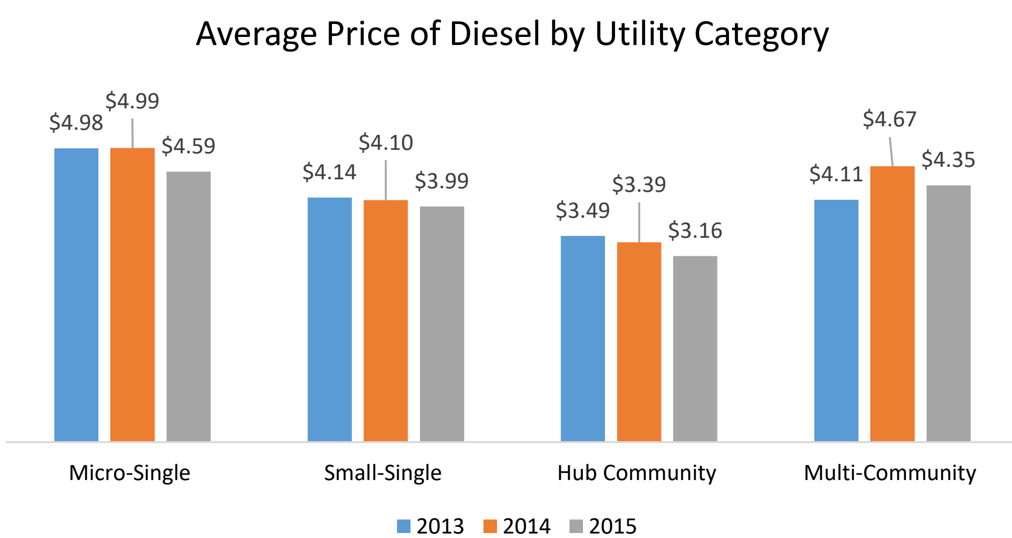

Figure 9: Average Price of Diesel by Utility Category (2013 to 2015)

How to Calculate

G&A Expense/Total Expenditure

Personnel Expense/ Total Expenditure

Operating Expense/ Total Expenditure

Fuel Expense/ Total Expenditure

Data Source

Expense categories and expenditures are from the Annual Reports, and fuel expenses are from the Statistical Reports.

Discussion

Although there is a slight reduction in operating costs as the utilities increase in size, there is no obvious trend between the categories according to the expense breakdown provided in the Annual Reports. All four rural utility categories are strikingly similar, despite the variation in a number of characteristics. Even though some utilities generate power from renewables, diesel fuel is still a common element across all categories. More analysis would be required to detect economies of scale from increased power generation, as the lack of reduced personnel or G&A expenses warrants further investigation.

When fuel is broken out separately (with fuel expense drawn from the Statistical Reports rather than the Annual Reports) a slightly different picture emerges. The four categories show a predictable pattern with the smallest utilities paying the highest percentage of fuel in relation to revenues. Part of the explanation is that hub and multi-community utility categories include communities with hydroelectric generation, which imposes non-fuel operating costs. The expense metrics illustrated here can be used as frames of reference to identify areas for cost containment and improved rate setting.

B. Operational Efficiency

Generation Unit Cost

This measure attempts to indicate a utility's cost in producing a kWh of electricity, including operational, G&A, personnel, and any other expenses. Expressing expenditures on a unit basis allows for easy comparisons between utilities with varying levels of power production. In principle, utilities with more efficient operations, access to cheaper fuel, or renewable energy sources should spend less to produce a given amount of electricity.

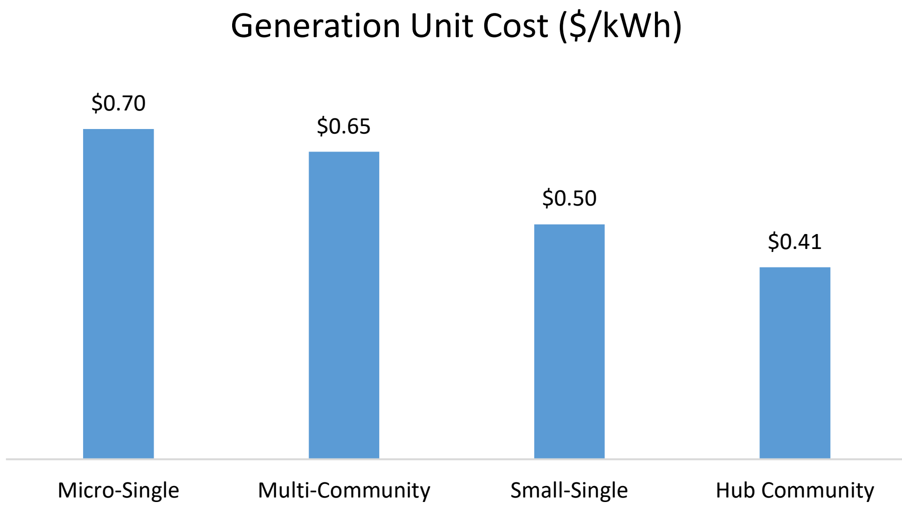

Figure 10: Generation Unit Cost ($/kWh) (2013-2016)

Micro-Single Utilities	Generation Unit Cost
Min	$0.39
25th Percentile	$0.60
Median	$0.68
75th Percentile	$0.85
Max	$3.00

Small-Single Utilities	Generation Unit Cost
Min	$0.08
25th Percentile	$0.42
Median	$0.50
75th Percentile	$0.66
Max	$1.72

Table 11: Micro-Single and Small-Single Utilities, Generation Unit Cost Quartiles

How to Calculate

Total Expenditure/kWh Generated

Data Source

Expenditures are from the Annual Reports, kWh generated is from the Statistical Reports.

Discussion

Unsurprisingly, micro-single utilities have some of the highest unit costs, with hub communities having, on average, the lowest. Multi-community utilities showed wide variation[11] with INN being only $.28 per kWh (likely due to hydroelectric generation) and the North Slope Borough coming it at $.83 per kWh. Significantly, higher generation unit costs—those far in excess of category averages—could be an indicator of operational inefficiencies.

Operating Expenses per kWh Generated

A related metric to generation unit cost is operating expenses per kWh generated. Singling out the operating expenses (primarily fuel and maintenance for most communities) associated with generating a unit of power provides a glimpse at the direct costs involved in production.

[11] Note: Alaska Power Company was excluded from this measure since it purchases a large share of its power rather than generating it, meaning its generation numbers are low compared to its expenditures.

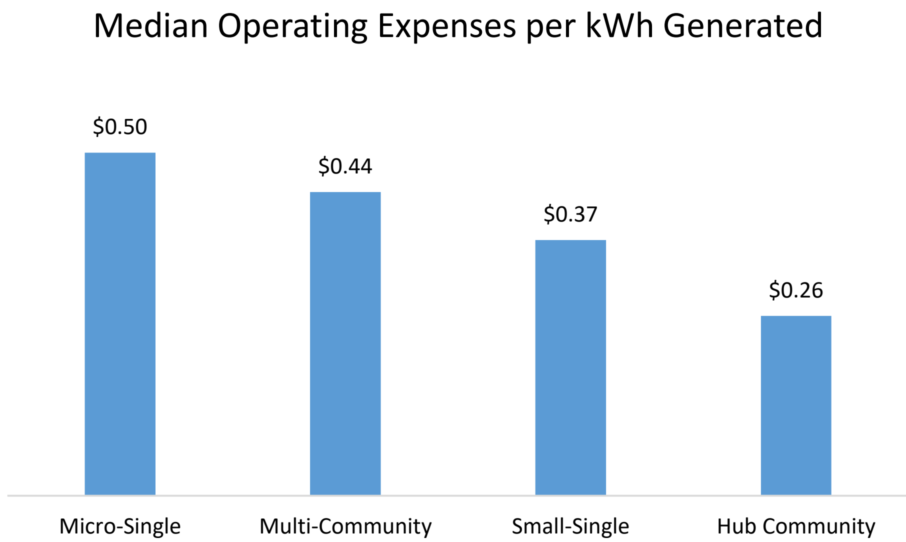

Figure 11: Median Operating Expenses per kWh Generated (2013-2016)

Micro-Single Utilities	Operating Expenses per kWh Generated
Min	$0.28
25th Percentile	$0.40
Median	$0.50
75th Percentile	$0.69
Max	$1.93

Small-Single Utilities	Operating Expenses per kWh Generated
Min	-$0.01
25th Percentile	$0.27
Median	$0.37
75th Percentile	$0.47
Max	$1.40

Table 12: Micro-Single and Small-Single Utilities, Operating Expenses per kWh Generated Quartiles

How to Calculate

Operating Expenses/kWh Generated

Data Source

kWh generated is from the Statistical Reports, operating expenses are from the Annual Reports.

Discussion

This metric tells a similar story to that of generation unit costs—that hub communities seem to produce power for the lowest cost of any of the categories.

Generation

This indicator examines the amount of power produced per household that was eligible for PCE subsidies. There are two classes of customers, residential and community facility.

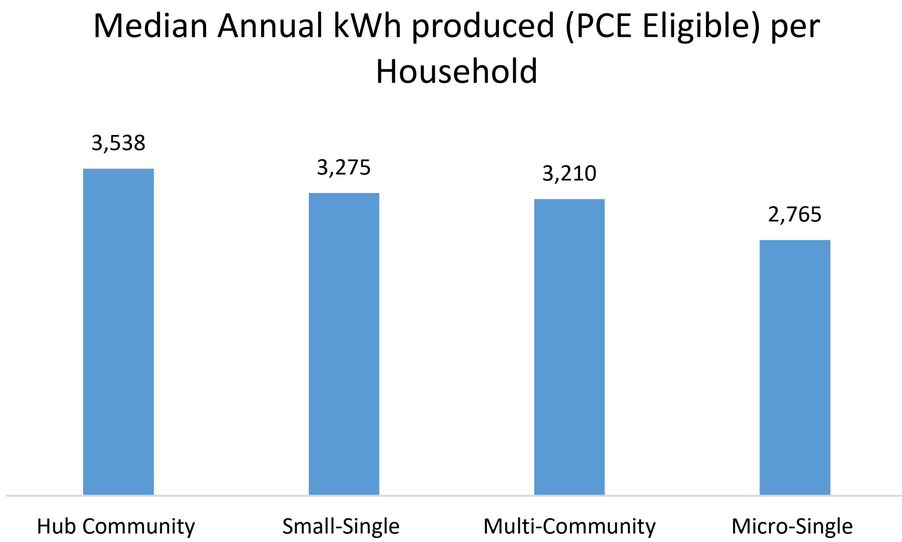

Figure 12: Median Annual kWh produced (PCE Eligible) per Household (2013-2016)

Micro-Single Utilities	Annual kWh Produced (PCE eligible) per Household
Min	795
25th Percentile	2,259
Median	2,965
75th Percentile	3,414
Max	4,429

Small-Single Utilities	Annual kWh Produced (PCE eligible) per Household
Min	1,826
25th Percentile	2,676
Median	3,335
75th Percentile	3,870
Max	4,522

Table 13: Micro-Single and Small-Single Utilities, Annual kWh Produced (PCE Eligible) per household Quartiles

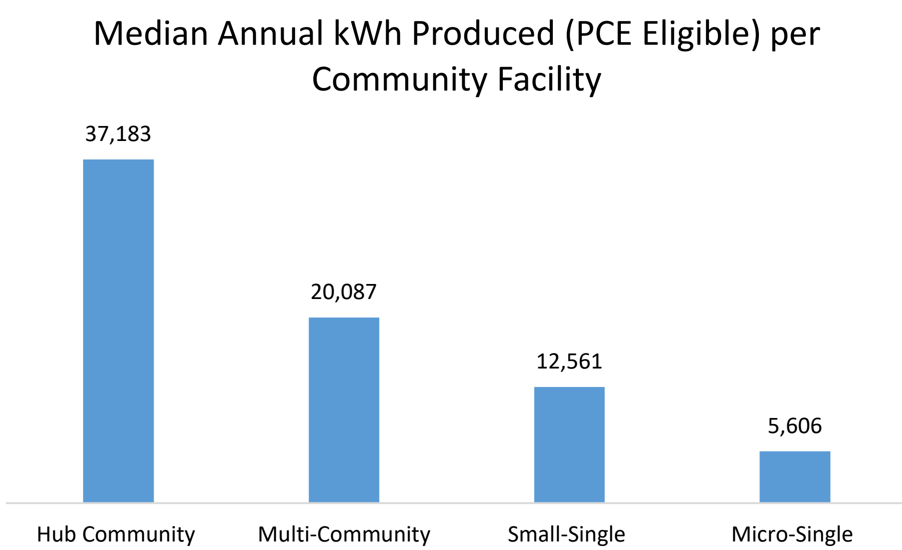

Figure 13: Median Annual kWh Produced (PCE Eligible) per Community Facility (2013-2016)

Micro-Single Utilities	Annual kWh Produced (PCE eligible) per Community Facility
Min	0
25th Percentile	2,406
Median	4,283
75th Percentile	7,176
Max	22,750

Small-Single Utilities	Annual kWh Produced (PCE eligible) per Community Facility
Min	1,774
25th Percentile	5,093
Median	10,392
75th Percentile	16,912
Max	48,406

Table 14: Micro-Single and Small-Single Utilities, Annual kWh Produced (PCE eligible) per Community Facility Quartiles

How to Calculate

kWh generated (PCE eligible)-Residential Customers/# of Residential Customers

kWh generated (PCE eligible)-Community Facility Customers/# of Community Facility Customers

Data Source

Both the amount of PCE eligible kWh generated and the number of households and community facilities were taken from the Statistical Reports.

Discussion

From the graph and quartile tables of PCE eligible kWh generated by residential customers, we see that micro-single, and multi-community utilities residential customers consume slightly less than their small-single utilities peers. This is not surprising as many of the multi-community utilities are made up of very small communities, and therefore would have similar consumption patterns to the stand along micro-small utilities. We also see a drastic difference in the power consumed by community facilities depending upon the utility category.

Generator Efficiency

The link between power costs and diesel costs is clear for most rural communities, as it is by far the largest single expense item. Larger capacity generators are often more efficient, and produce more kWh of electricity per gallon. Additionally, systems that are older or poorly maintained are less efficient than those that receive better maintenance. Tracking the amount of power produced in comparison to the amount of fuel used is thus one of the simplest and most useful ways to measure system efficiency.

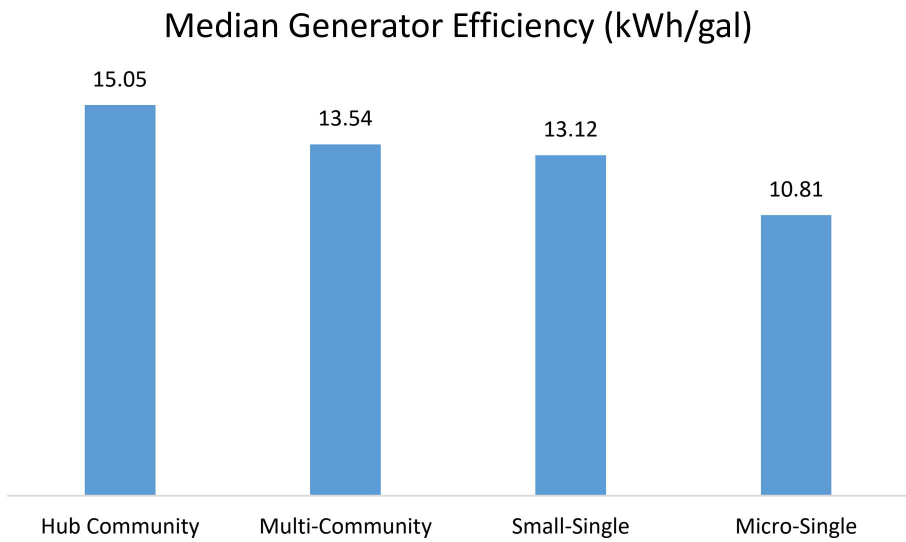

Figure 14: Median Generator Efficiency (kWh/gal) (2013-2016)

Micro-Single Utilities	Generator Efficiency (kWh/gal)
Min	6.77
25th Percentile	10.16
Median	10.85
75th Percentile	12.03
Max	17.57

Small-Single Utilities	Generator Efficiency (kWh/gal)
Min	7.38
25th Percentile	11.79
Median	13.12
75th Percentile	13.83
Max	15.63

Table 15: Micro-Single and Small-Single Utilities, Generator Efficiency Quartiles

How to Calculate

kWh Generated from Diesel/Gallons of Fuel Used

Data Source

The number of kWh generated and gallons used came from the Statistical Reports.

Discussion

Hub community utilities seem to generate power more efficiently than the other categories, likely due to their ability to use larger capacity generators, and maintain them to optimize efficiency. Multi-community utilities were next, but the contrast is interesting. Multi-community utilities may be able to achieve administrative cost savings, but if they serve multiple small villages without central generation and distribution their efficiency will lag. The efficiency gap between small-single and micro-single utilities is also noteworthy, and again points to some combination of better maintenance and higher capacity generators.

Line Loss

The purpose of the line loss indicator is to measure the condition of the community distribution system. High percentages of line loss often indicate older and degrading infrastructure, as more power is escaping through the power lines and therefore not able to be sold.

Percent Loss	System Component
1-2%	Step Up transformer from Generator to Transmission line
2-4%	Transmission line
1-2%	Step Down transformer from Transmission line to Distribution Network
4-6%	Distribution transformers and cables
8-15%	**Overall Losses between Power Plant and Consumers**

Table 16: Power Loss in a Typical Power Transmission System
Source: International Electro Technical Commission. (2007) "Efficient Electrical Energy Transmission and Distribution"

Alaska Administrative Code sets the "allowable line loss" amount at 12%.[12] AEA calculates line loss as total generation minus station service minus kWh sold, divided by the total generation. Many utilities have inconsistent line loss readings due to faulty equipment, making accurate line loss readings difficult.

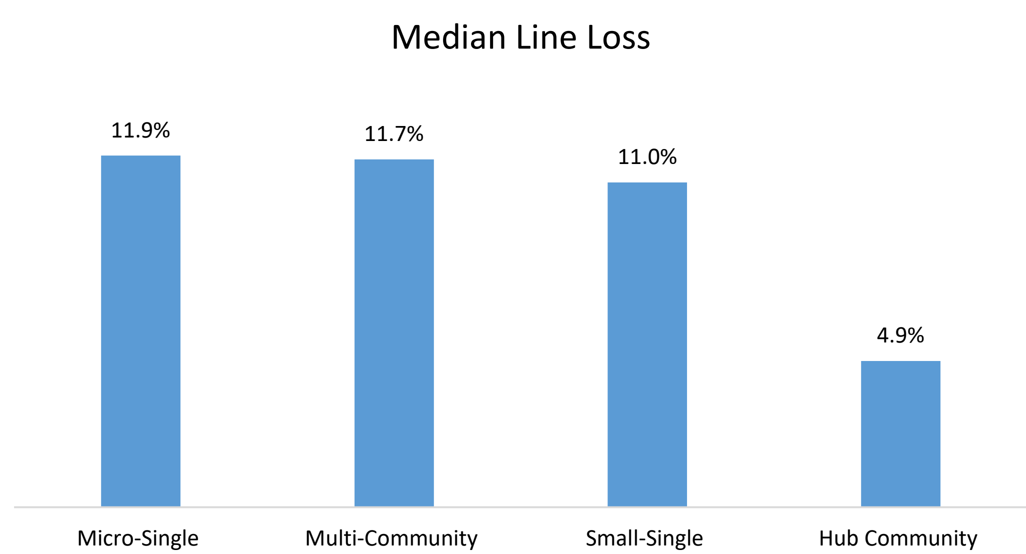

Figure 15: Median Line Loss (2013-2016)

Micro-Single Utilities	Line Loss
Min	4.7%
25th Percentile	7.4%
Median	11.1%
75th Percentile	14.3%
Max	26.3%

Small-Single Utilities	Line Loss
Min	4.5%
25th Percentile	7.1%
Median	11.0%
75th Percentile	14.7%
Max	23.4%

Table 17: Micro-Single and Small-Single Utilities, Line Loss Quartiles

How to Calculate

This indicator is pre-calculated by AEA.

Data Source

The line loss percentages for each utility were taken directly from the Statistical Reports.

[12] Source: 3 AAC 52.620(b).

Discussion

Hub communities have considerably lower rates of line loss than the other three categories, around 6% less. However, what is most interesting is that multi-community utilities have almost as much line loss as the micro-single utilities. This is most likely due to the way in which this indicator is calculated. Some of the co-ops in the multi-community category share power through intertie, which is then recorded as a higher percentage of line loss for one particular community, and no line loss for the community receiving power. This seems to be recorded as line loss, even though it is not line loss under AEA's definition.

Payroll Expenditure per kWh

It is not possible to compare the number of employees per utility to the amount of power generated because most utilities do not report how many employees they have. Additionally, many micro and small-single utilities are not staffed by full-time employees. Therefore, this metric looks at the payroll expenditures per kWh produced ($/kWh generated) as a way to relate power output to staffing levels.

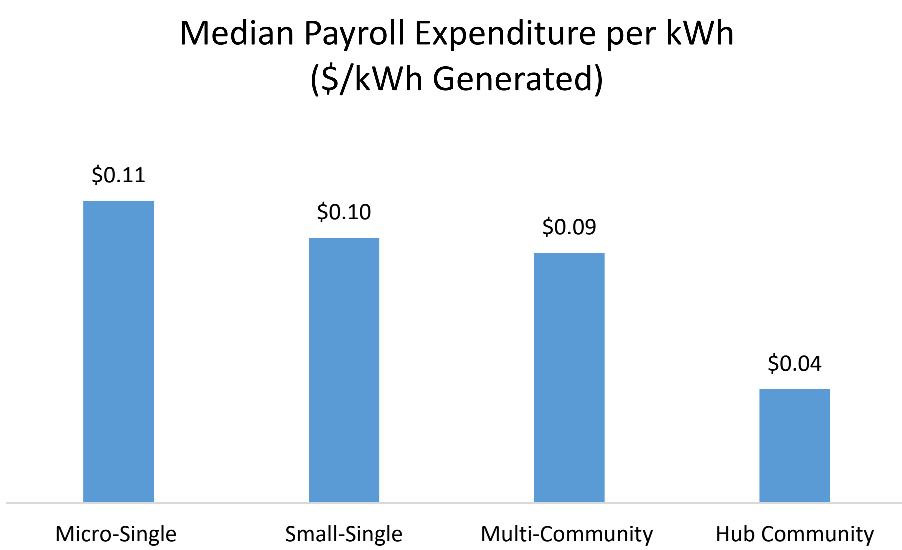

Figure 16: Median Payroll Expenditure per kWh ($/kWh Generated) (2013 to 2015)

Micro-Single Utilities	Payroll $ per kWh
Min	$0.04
25th Percentile	$0.09
Median	$0.11
75th Percentile	$0.18
Max	$0.29

Small-Single Utilities	Payroll $ per kWh
Min	$0.01
25th Percentile	$0.05
Median	$0.10
75th Percentile	$0.12
Max	$0.31

Table 18: Micro-Single and Small-Single Utilities, Payroll Expenditure per kWh Quartiles

How to Calculate

Total payroll expenditure/ kWh generated

Data Source

The total kWh generated came from the Statistical Reports, while the payroll expenditures information came from the Annual Reports.

Discussion

Unsurprisingly the micro-single utilities spend the most on payroll per kWh generated, and hub community utilities spend the least per kWh generated. This may indicate an economy of scale for the hub community utilities. Multi-community and small-single utilities spend nearly identical amounts on payroll per kWh generated.

C. Financial Capacity

Debt to Equity Ratio

The debt to equity ratio compares the amount of money the utility owes (liabilities) to its equity, which is the value of assets minus liabilities. A high debt to equity ratio may signify that a utility is heavily indebted, while a low ratio could mean it is underutilizing debt as a financing tool. Among large companies the ratio reflects the use of leverage in comparison to shareholder equity, but in the case of rural utilities it can be used to indicate the extent to which they are utilizing any form of debt financing.

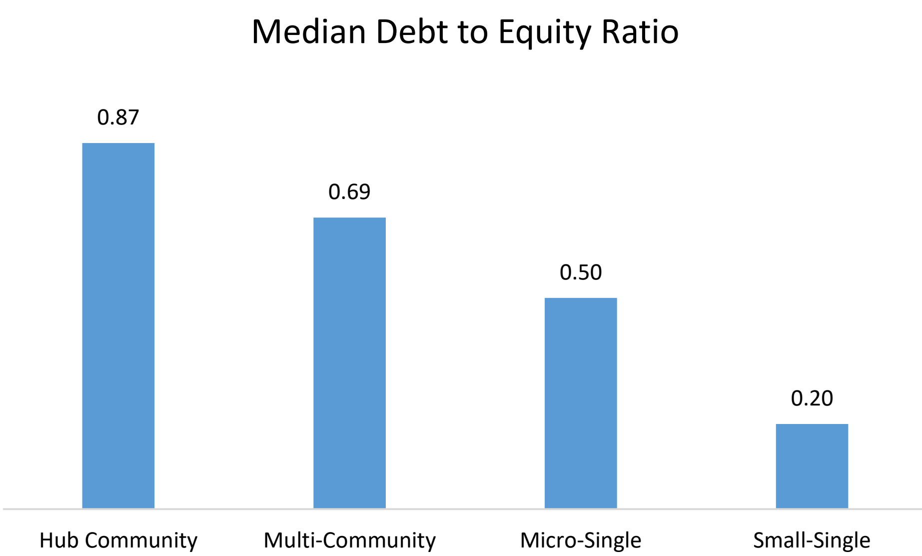

Figure 17: Median Debt to Equity Ratio (2013-2016)

Micro-Single Utilities	D:E Ratio
Min	-16.90
25th Percentile	0.00
Median	0.50
75th Percentile	0.97
Max	4.85

Small-Single Utilities	D:E Ratio
Min	-15.75
25th Percentile	0.01
Median	0.20
75th Percentile	0.63
Max	5.47

Table 19: Micro-Single and Small-Single Utilities, Debt to Equity Ratio Quartiles

Utility Category	Long-term Debt	No Long-term Debt	Percent with Long-term Debt
Micro-Single Utilities	4	25	14%
Small-Single Utilities	11	29	28%
Hub Community Utilities	4	1	80%
Multi-Community Utilities	4	3	57%

Table 20: Utilities reporting long-term debt in 2015

How to Calculate

Total Liabilities/Equity

Data Source

The debt and equity data is from the Annual Reports.

Discussion

The two larger categories have, on average, higher debt to equity ratios than the micro-single and small-single utilities. It is unsurprising that the smallest utilities have little debt, since in many cases they would have trouble borrowing money from traditional lenders. Hub and multi-community utilities, on the other hand, have greater borrowing capacity. Additionally, utilities with populations under 2,000 people can receive funds from the Rural Power System Upgrade Program, mitigating the need for them to take on debt. A small number of utilities listed the source of debt on their Annual Reports, with the most common being Bulk Fuel Loans. This ratio is not suggested as a benchmark to evaluate utility management, but does provide a useful way to measure and compare the use of debt.

Accounts Receivable Days

Accounts receivable days measures the collection efficiency of a utility by approximating the average number of days it takes to collect on money owed. Since most utility customers (and other payers) are on a monthly billing cycle, a utility that collects with optimal efficiency should show a value of roughly 30 for this metric. It is based upon the share of accounts receivable to annual revenues, times the number of days in a year.

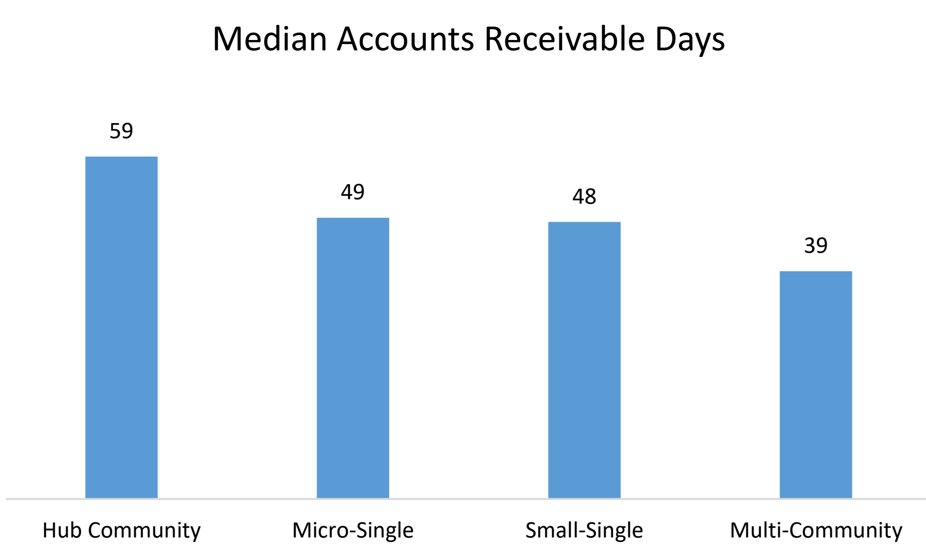

Figure 18: Median Accounts Receivable Days (2013-2016)

Micro-Single Utilities	Accounts Receivable Days
Min	12.58
25th Percentile	40.45
Median	60.49
75th Percentile	206.66
Max	373.04

Small-Single Utilities	Accounts Receivable Days
Min	-27.34
25th Percentile	13.07
Median	40.99
75th Percentile	76.19
Max	244.93

Table 21: Micro-Single and Small-Single Utilities, Accounts Receivable Days Quartiles

How to Calculate

*(Accounts Receivable/Gross Revenue) *365*

Data Source

The accounts receivable and gross revenue data is from the Annual Reports.

Discussion

It is quite surprising that hub community utilities have the highest number of accounts receivable days. As can be seen in the data appendix, there were a few utilities in the hub community category that had much higher number of accounts receivable days, which skewed the median for that category. The lower number of accounts receivable days for the larger multi-community category, can be explained by an oftentimes larger group of billing and accounting staff.

D. Other Data Collected

While not the primary focus of this study, AEA expressed specific interest in other relevant information reflected in the Annual Reports. There was generally not enough information to flesh out indicators and baselines for the data below. However, that lack of data was interesting and warranted reporting, given the relevance of the importance of outages/breakdowns, current ratio, and debt/source.

Outages Reported

The number of outages and/or breakdowns is important information to assess quality of service. While this is an important indicator, Aniak was the only utility that reported having utility breakdowns. Their breakdown counts ranged from 4 to 13 per year. While Aniak was the only community found to have outage data in the Annual Reports, all 13 of the utilities that participated in the survey responded to the question on outages/breakdowns. One community was unsure the number of breakdowns that had occurred in the past year, while the other 12 reported the number outages in the past year to range from zero up to 20. Based on anecdotal evidence from speaking with other industry experts, this range of breakdowns seem pretty typical. All of this data seems to signal technical challenges, both for the utilities reporting a high number of breakdowns per year, and for those communities currently not tracking the number of breakdowns per year. While there was not enough data to flesh out this indicator, it is still important to be collecting this information, and there needs to be a better mechanism for utilities to report breakdowns and outages.

Current Ratio

The current ratio looks at the “bankability” of the utilities. The current ratio examines how likely a firm is to be able to meet their current financial obligations by comparing current assets—relatively liquid assets that can be converted into cash within a year—to current liabilities, which are obligations to be paid within a year. An ideal current ratio is usually ranges between one and three, as a general rule. The current ratio is calculated by dividing total current assets by total current liabilities. Since this metric could only be computed for a total of six utilities, it was difficult to make generalizations. The Annual Reports do not neatly break out current liabilities and assets, and many utilities left key fields on the balance sheet form in the Annual Report blank. Therefore, the current ratio was not included as a metric. However, in the future it will be important to compute this metric to determine the bankability of utilities.

Debt and Source

There was quite a bit of information on the amount of long term debt utilities were carrying. However, the source of that debt proved to be a more elusive type of data to collect. Only 9 of 80 communities reported the source of debt on their Annual Reports. Bulk fuel was the most common debt source, with 7 of the 9 communities reporting that as the source of their debt. Outside of Bulk Fuel Loans there was little evidence of other debt sources. It seems that most of the debt utilities are carrying is related to bulk fuel purchases. Based on the data it seems that utilities are not getting commercial loans for the most part.

VII. Survey Results

The survey was designed to explore challenges utility managers face, as well as to seek clarification on publicly available data that had been gathered for each of the respective utilities. Below is a sampling of the survey questions with some analysis on respondents' answers. Additional information about the survey and respondents' answers can be found in the appendix.

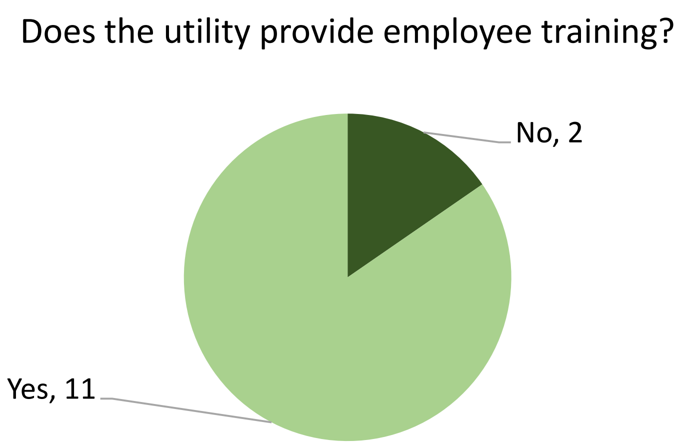

Figure 19: Survey question: "Does the utility provide employee training?"

Almost all of the utilities responding to the survey provide some type of employee training. The training ranged from basic bookkeeping, to instruction on maintenance of equipment. Interestingly, while almost all of the respondents currently provide training, many were interested in increasing their training offerings, particularly if the training could be brought to them.

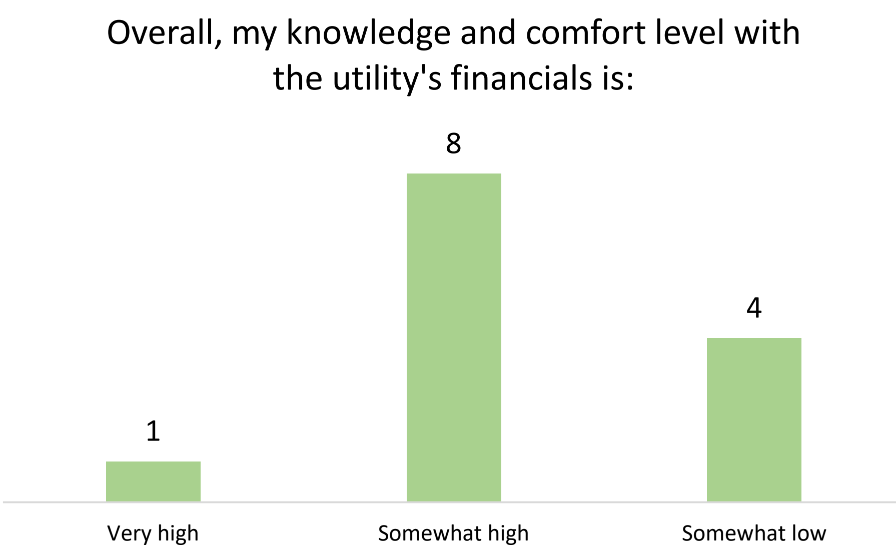

Figure 20: Survey question: "Overall, my knowledge and comfort level with the utility's financials is:"

As state funding for infrastructure and capital improvements improve, and utilities move towards taking out conventional loans, or qualifying for other grant program, having financials in order is paramount.

Not surprisingly 8 of the 13, managers felt fairly confident in understanding and working with financials. However, while feeling confident, many managers asked for additional training around financial and regulatory compliance.

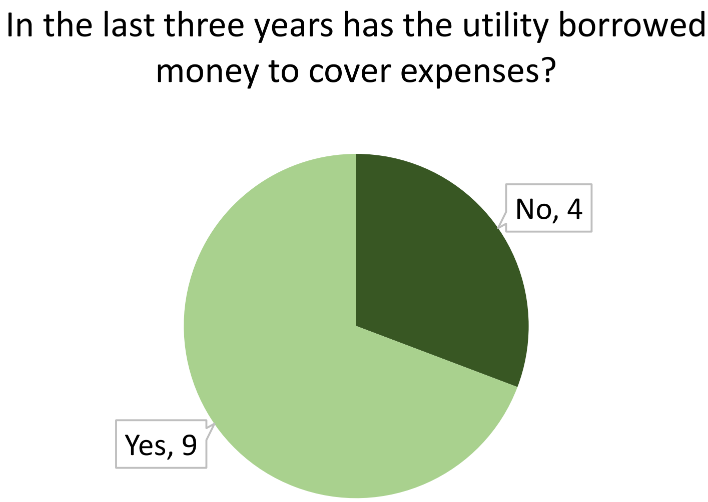

Figure 21: Survey question: "In the last three years has the utility borrowed money to cover expenses?"

This is an interesting question as it was examining if utilities were accessing outside financing. As can be seen below in the answers from the follow up question, most of money being borrowed was for large fuel purchases through the Bulk Fuel Loan program.

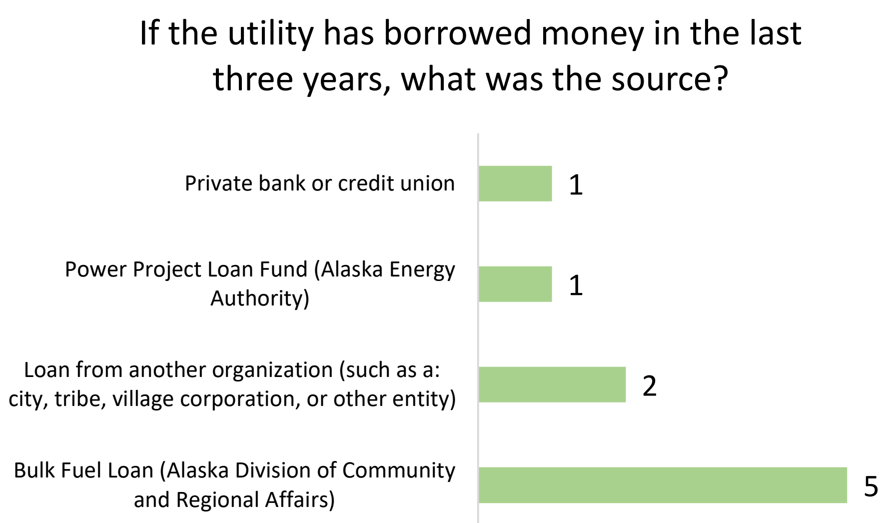

Figure 22: Survey question: "If the utility has borrowed money in the last three years, what was the source?"

Many utilities rely on the Bulk Fuel Loan program to be able to purchase fuel at lower rates for many months at a time. Without the Bulk Fuel Loan program, it is unlikely that most rural utilities would have the operating capital necessary to purchase multiple months of fuel at a time. It would be interesting to know what loans from other organizations were obtained, and if those loans required a rigorous financial screening similar to a private bank loan. None of the respondents has the source of the borrowed money on their Annual Reports.

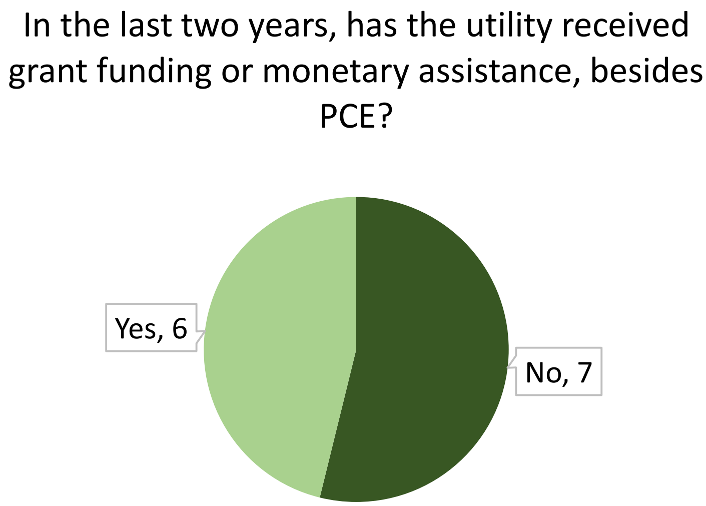

Figure 23: Survey question: "In the last two years, has the utility received grant funding or monetary assistance, besides PCE?"

It is interesting that just under half of the respondents' report receiving grants funding or monetary assistance, as none of the respondents had any "other subsidies" indicated on their Annual Reports. However, it is encouraging to see that almost half of the respondents had received grant funding outside of the PCE program, which seems to signal a diversification in outside funding sources. The funding sources varied quite a bit. Federal grants included a *Rural High Energy Cost* Grant, through the U.S. Department of Agriculture (USDA), and Diesel Emissions Reduction Act (DERA) funding through the Environmental Protection Agency (EPA), and administered by AEA. State funding included the revenue sharing (now community assistance) program, AEA grants, and Community Development Quota (CDQ) funding.

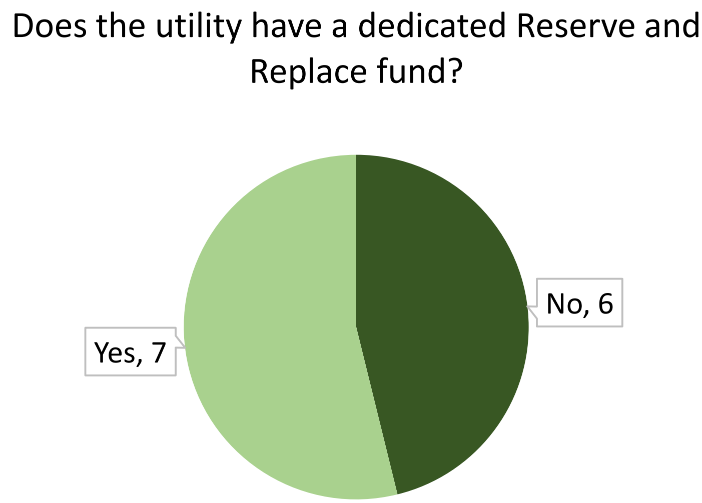

Figure 24: Survey question: "Does the utility have a dedicated Reserve and Replace fund?"

The Denali Commission is an independent agency designed to provide critical utilities, infrastructure and economic support throughout rural Alaska. One of the Denali Commission requirements for awarding funds is the maintenance of a Reserve and Replace fund, especially for bulk fuel farms. The Denali Commission awards funds depending on whether they consider a community to be "distressed." Not every community within this study classifies as distressed, and determining which were required to have Reserve and Replace Funds was beyond the scope of this study. However, the presence of a Reserve and Replace fund, and its amounts, was pertinent to this study.

Over half of the respondents reported having a dedicated Reserve and Replace fund. Interestingly, utilities that reported having reserve and replace accounts on this survey, did not have any record of the accounts in their Annual Reports.

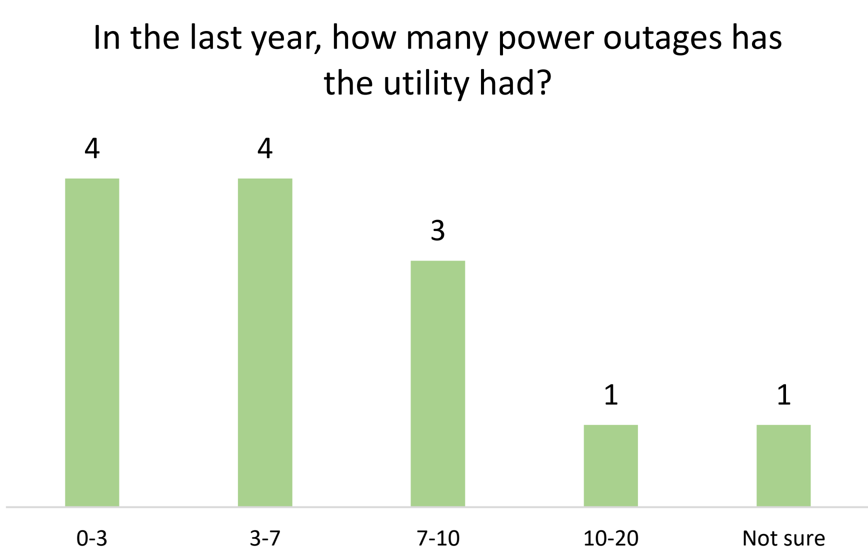

Figure 25: Survey question: "In the last year, how many power outages has the utility had?"

There is a large amount of variance in the number of reported outages per year. Interestingly, none of the utilities that reported outages through this survey, had outage data on their Annual Reports. However, that does not seem to be uncommon, as there was only one community out of 80 that reported outage data. Data on the number of breakdowns/outages is supposed to be reported through the Annual Reports. This is important information that helps gauge the quality of service for the utility.

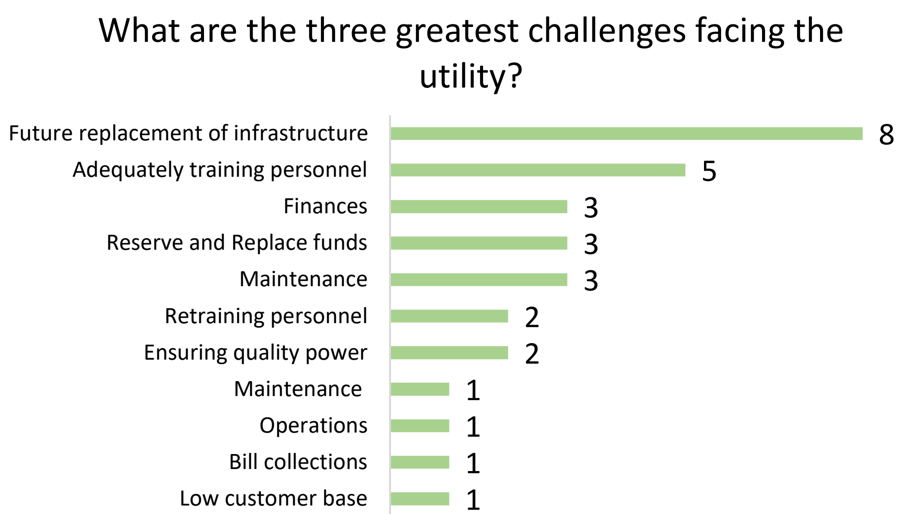

Figure 26: Survey question: "What are the three greatest challenges facing the utility?"

The top five challenges facing utilities are interrelated. Future replacement of infrastructure is top of mind for utility managers, as is having the necessary Reserve and Replace funds available when needed. The second most noted challenge, lack of adequately trained personnel, can adversely affect the need for replacement infrastructure. Without properly trained personnel to perform routine maintenance, infrastructure will often fail before it is supposed to. Finally, maintaining the business aspects of the utility can be difficult without the proper personnel to assist with the finances and regulatory reporting.

What information or data will help you be more effective in decision making for the utility?			
	Very Desirable	**Desirable**	**Undesirable**
Efficiency (gallons per kWh)	10	0	0
Line Loss	5	6	0
Smart meters/other similar technology	3	8	0
Expected vs. actual performance of generation infrastructure	**11**	0	0
Investment opportunities to increase reliability	2	6	3
Investment opportunities for reducing customer costs	2	7	2

Table 22: Survey question: "What information will help you be more effective in decision making for the utility?"

After examining the greatest challenges facing the utility, managers were asked about the types of data and/or data tools that would help them be more effective. Overwhelmingly, managers requested data on generation and efficiency. Interestingly, fewer managers requested more information on smart meters, which could help with the monitoring of generation, efficiency, and line loss. This is most likely due to the fact that some utilities already have smart meters in place, and therefore do not require additional information, or because the managers were unfamiliar with smart meter technology. Finally, managers were interested in investment opportunities to increase reliability and reduce customer costs. Given the decreased response rate for the investment questions, it seems these questions should have been worded differently to discuss things like renewable energy or technology to reduce line loss.

If an advice/assistance program was developed, the following types of assistance would be useful:			
	Very Desirable	**Desirable**	**Undesirable**
Regulatory reporting	**11**	0	0
Accounting/financial management	5	6	0
Budgeting for capital improvements	0	**11**	0
Calculating rates	1	5	5
Employee training: bookkeeping	2	9	0

Table 23: Survey question: "If an advice/assistance program was developed, the following types of assistance would be useful:"

Utility managers were overwhelmingly interested in training and assistance around regulatory reporting and budgeting/financial management. It is odd that all managers are interested in regulatory reporting, but seemingly disinterested in assistance around calculating rates. Some utilities lacked a rate setting process, and of those that reported having a rate setting process, many noted that rates were dependent on PCE subsidies.

VIII. Findings/Recommendations

The introduction of this report laid out several questions that the survey and indicator analysis attempted to answer. Each of these questions will now be addressed below to the extent possible.

How should rural electric utilities be categorized to offer meaningful comparisons?
One of the tasks of this report was to develop a meaningful set of peer groupings of the PCE-eligible rural utilities. Given the tremendous diversity in terms of size of customer base, use of renewable energy, ease of fuel and supply delivery, differences in organizational structure, and other characteristics, this posed a challenge. In spite of the diversity, however, the categories of micro-single, small-single, and hub community provided meaningful comparisons in most instances. The multi-community category, however, was more problematic.

For most of the indicators, the researchers predicted that micro-single utilities would show the highest costs and lowest efficiency measures, owing to their lack of resources and scale, followed by small-single utilities, hub community utilities, and finally multi-community utilities. As the analysis progressed, however, the multi-community category showed wide variability. For instance, it had the highest net margins, but also relatively high generation unit costs. Furthermore, the utilities within the category vary considerably on a number of attributes. Alaska Power Company, utilizes inexpensive hydro-electric power, and the North Slope Borough provides an operating subsidy. Alaska Village Electric Cooperative (AVEC) used a non-standard financial format that made comparisons difficult, and so it was excluded from 6 of the 11 indicators.

Do utilities collect enough revenue to meet their expenses?
The degree to which many utilities appear to be operating at a loss is somewhat jarring. Taken together, almost half of the micro-single and small-single utilities report average net margins that are negative. The PCE program applies to most fuel and non-fuel expenses. Therefore, negative margins probably reflect inadequate rate-setting in most cases, since PCE is based on the lesser of calculated generation cost per kWh or kWh charges set by utilities. Since many micro-single and small-single utilities are owned by tribes or municipalities, it is possible that these operating losses are being subsidized by another source of funds which may or may not be eligible for PCE subsidy depending on how the costs are accounted for.

What are the major expenses utilities face, and how do the expense structures compare between utilities?
One finding from the indicator analysis is that all categories of utilities have broadly similar expense structures, expressed in terms of general and administrative (G&A), personnel, and operating expenses as a percent of revenue. Larger hub and multi-community utilities appear to contain operating costs somewhat—an advantage of scale. Looking separately at fuel expenses, the burden is especially high for micro-single utilities.

How dependent are utilities on PCE revenue?
Unsurprisingly, the two smaller categories tend to have the highest dependency on PCE in terms of gross revenues. Making up roughly a quarter of the income streams of the micro-single and small-single utilities, PCE is a key source of revenue. The two smaller categories may also tend to have less commercial activity, making a larger share of their total output eligible for the PCE program. Given the number of utilities with negative net margins, more accurate rate-setting and accounting would likely raise the share of PCE revenues among these categories.

Lenders may have a particular interest in PCE reporting and accounting, since it ensures a stream of cash flow that can be used to cover debt service, given proper accounting.

How efficient are utilities in generating power with the resources provided?
Multiple dimensions of efficiency were examined, but probably the most useful is operating expenses per kWh, which provides a simple way to compare utilities even when they use sources other than diesel. Generation unit cost is another useful metric that could be compared to rates set by utilities—to recoup costs, generation (minus station service and line loss) unit costs and pre-PCE rates should be similar values.

Hub community utilities seem to be the most efficient on several measures, in part because they have larger capacity, and seemingly more efficient generators. It should be noted that the lower efficiency measures of smaller communities are not necessarily due to management decisions, but lack of scale.

Do utilities exhibit much capacity to obtain and repay debt financing?
Many utilities utilize state-run loan programs through the Bulk Fuel Revolving Loan Fund or the Power Project Loan Fund to cover key operating costs or asset purchases. For traditional lenders, however, the available financial data suggests that most utilities are not credit worthy. For instance, the negative net margins of many smaller utilities points to a limited ability to pay debt service.

What types of measures do rural utility managers consider important or useful?
Rural utility managers are concerned with financial and regulatory compliance, as well as generation performance and efficiency. Therefore, having access to data around things like: line loss, efficiency, and power generated vs. power sold, is important. In terms of financial and regulatory compliance, measures around creditworthiness, and dependence on subsidies would be useful. In addition, many utilities would like more information about how to lower customer costs through investment in infrastructure and/or renewable energy.

What kinds of assistance do utility managers say they need?
Utility managers are looking for additional training, particularly training that can take place on-site, or closer to where they are located. Training around finances, bookkeeping, and regulatory reporting ranked high on the list of priorities for utility mangers. In addition, many utility managers were very interested in training/assistance around how to budget for capital improvements. Additionally, a majority of utility managers listed saving/planning for future infrastructure as their top concern. As State funds for infrastructure/capital improvements dwindle, utilities will increasingly require training/assistance around how to acquire funding on their own.

Do utilities set aside monies to replace assets at the end of their useful lives?
Between the Annual Reports and the survey, 20 utilities were found to have Reserve and Replace funds. While there were multiple utilities who reported savings accounts, without additional information it is not possible to determine if these savings accounts are specifically designated as Reserve and Replace accounts, or more general savings accounts. The dollar amount in those accounts ranged from $0 to just shy of $1M, with approximately 64%[13] of the accounts having less than $20,000.

[13]Note: Of those accounts where a dollar amount was reported.

Appendix A: Taxonomy of Utilities

Micro-Single Utilities, 2015 Data

Community Name	Population Served	kWh Generated (in 2015)	Residential Rate	Effective Rate (w/PCE)	Total Expenditure
Akhiok	85	292,223	$0.45	$0.00	$173,211
Arctic Village	175	226,173	$1.00	$0.54	$398,765
Atmautluak	305	357,268	$0.80	$0.46	$370,627
Beaver	77	295,706	$0.90	$0.41	N/A
Chenega	63	254,832	$0.95	$0.23	$191,110
Chignik Lake	76	381,431	$0.86	$0.37	$286,835
Chitina	132	458,762	$0.71	$0.42	$222,311
Circle	107	371,920	$0.71	$0.24	$258,334
Clarks Point	54	233,090	$0.91	$0.57	$162,483
Elfin Cove	39	290,587	$0.75	$0.32	$167,003
Hughes	88	448,305	$0.71	$0.15	$339,826
Igiugig	44	341,469	$0.81	$0.28	$224,812
Karluk	43	208,071	$0.70	$0.19	$131,832
Kokhanok	174	417,544	$0.90	$0.49	$316,374
Koyukuk	89	305,455	$0.95	$0.46	$190,642
Levelock	79	475,619	$0.70	$0.27	$305,043
Lime Village	25	74,202	$1.80	$0.97	$109,273
Napakiak	362	N/A	$0.85	$0.30	$464,794
Nelson Lagoon	45	327,582	$0.84	$0.18	$221,755
Nikolai	108	442,290	$0.90	$0.34	$267,122
Pedro Bay	42	193,781	$0.91	$0.48	$137,291
Perryville	113	438,037	N/A	N/A	$177,374
Pilot Point	70	425,666	$0.60	$0.23	$361,860
Takotna	56	112,910	$1.00	$0.41	$155,332
Tatitlek	87	210,079	$0.92	$0.45	$365,571
Tenakee Springs	141	390,901	$0.70	$0.32	$214,200
Twin hills	82	N/A	$1.00	$0.62	$98,594
Umnak	18	187,210	$0.75	$0.15	$171,682
Newtok (Ungusraq)	400	477,000	$0.80	$0.24	$223,065

Small-Single Utilities, 2015 Data

Community Name	Population Served	kWh Generated (in 2015)	Residential Rate	Effective Rate (w/PCE)	Total Expenditure
Akiachak	675	1,922,885	$0.67	$0.29	$519,982
Akiak	355	1,333,301	$0.63	$0.31	$521,455
Akutan	1,027	614,049			$566,898
Aniak	546	2,667,200	$0.79	$0.30	$1,450,754
Atka	67	524,898	$0.73	$0.31	$519,631
Buckland	487	1,760,517	$0.47	$0.22	$830,820
Central (Gold Country Energy)	91	577,608	$0.57	$0.29	N/A
Chignik	92	756,797	$0.49	$0.16	$399,710
Chignik Lagoon	78	642,756	$0.62	$0.28	$204,828
Deering	139	763,532	$0.70	$0.30	$353,778
Egegik	112	658,979	$0.86	$0.44	$423,383
False Pass	40	672,095	$0.42	$0.15	$390,828
Galena	483	5,591,769	$0.67	$0.34	N/A
Golovin	181	884,030	$0.56	$0.22	$366,918
King Cove	934	4,459,228	$0.30	$0.24	$1.070,233
Kipnuk	656	1,883,748	$0.83	$0.22	$370,608
Kwethluk	783	1,584,650	$0.52	$0.21	$634,465
Kwigillingok	349	1,106,331	$0.67	$0.27	$143,986
Larsen Bay	88	956,345	$0.44	$0.44	N/A
Manokotak	492	1,458,228	$0.55	$0.32	$1,548,080
McGrath	320	2,470,916	$0.86	$0.37	-$90,580
Naknek	362	21,716,919	$0.58	$0.18	$5,855,527
Napaskiak	442	986,912	$0.70	$0.34	$1,143,217
Chefornak (Naterkaq)	436	1,545,445	$0.49	$0.19	$752,990
Nunam Iqua	211	885,866	$0.53	$0.19	$389,836
Ouzinkie	185	834,557	$0.36	$0.17	$7,936
Pelican	79	1,167,946	$0.47	$0.23	N/A
Port Heiden	118	606,000	$0.75	$0.28	N/A
Puvurnaq	456	1,417,883	$0.65	$0.37	$524,947
Ruby	202	675,251	$0.84	$0.45	$385,246
Saint George	97	606,929	$1.00	$0.32	$508,989
Saint Paul	453	3,357,089	$0.47	$0.17	$2,823,154
Port Alsworth (Tanalian)	56	865,709	$0.57	$0.17	$431,912
Tanana	238	1,286,465	$1.00	$0.56	$767,002
Tuluksak	380	530,780	$0.96	$0.67	$229,367
Tuntutuliak	417	1,088,362	$0.65	$0.32	$598,723
Unalakleet	701	4,571,297	$0.47	$0.22	$1,717,433

Venetie	197	599,200	$0.92	$0.48	$401,901
White Mountain	197	770,600	$0.62	$0.29	$432,700
Yakutat	622	6,068,596	$0.44	$0.17	$2,804,283

Hub Community Utilities, 2015 Data

Community Name	Population Served	kWh Generated (in 2015)	Residential Rate	Effective Rate (w/PCE)	Total Expenditure
Cordova	2,302	28,898,608	$0.34	$0.23	$6,598,624
Kotzebue	3,202	18,117,048	$0.43	$0.18	$8,096,263
Nome	3,659	31,840,307	$0.43	$0.23	$12,610,675
Dillingham (Nushagak Co-op)	2,606	17,127,300	$0.48	$0.20	$8,145,094
Unalaska	4,737	46,834,146	$0.40	$0.25	$15,816,225

Multi-Community Utilities, 2015 Data

Community Name	Population Served	kWh Generated (in 2015)	Residential Rate	Effective Rate (w/PCE)	Total Expenditure
APC	9,928	20,350,553	$0.51	$0.29	$21,748,334
AVEC	30,157	120,059,838	$0.63	$0.22	$53,513,996
Illiamna, N, N	476	3,781,372	$0.57	$0.33	$1,229,036
Inside Passage	2,671	8,419,888	$0.59	$0.22	$4,353,799
Middle Kuskokwim	381	964,106	$0.75	$0.19	$942,930
North Slope Borough	2,761	23,306,421	$0.15	$0.16	$21,306,606

Appendix B: Data Appendix

Average Net Margin (2013-2016)

Micro-Single Utilities	Net Margin
Twin Hills	40.0%
Perryville	39.9%
Takotna	19.8%
Tenakee Springs	15.3%
Elfin Cove	11.3%
Chitina	11.3%
Nikolai	10.8%
Pedro Bay	10.4%
Atmautluak	10.2%
Karluk	10.0%
Beaver	4.6%
Nelson Lagoon	1.5%
Napakiak	1.0%
Circle	-2.0%
Levelock	-4.2%
Kokhanok	-6.6%
Igiugig	-15.5%
Lime Village	-15.6%
Tatitlek	-18.8%
Chenega	-21.1%
Pilot Point	-22.2%
Koyukuk	-23.9%
Ungusraq (Newtok)	-24.8%
Clarks Point	-32.3%
Umnak	-32.6%
Chignik Lake	-43.8%
Arctic Village	-45.8%
Akhiok	-419.0%

Small-Single Utilities	Net Margin
Larsen Bay	65.7%
Tuluksak	39.3%
Kipnuk	30.0%
Akiachak	25.4%
False Pass	22.2%
King Cove	20.1%
Kwigillingok	19.7%
Egegik	17.8%
Pelican	17.3%
Golovin	16.1%
Deering	13.1%
White Mountain	12.9%

Kwethluk	11.3%
McGrath	10.1%
Ouzinkie	9.7%
Unalakleet	4.8%
Ruby	4.0%
Aniak	3.3%
Tuntutuliak	3.1%
Nunam Iqua	2.8%
Tanalian (Port Alsworth)	2.7%
Galena	2.3%
Buckland	1.4%
Akutan	1.3%
Napaskiak	0.7%
Tanana	-1.2%
Chignik	-5.1%
Naterkaq (Chefornak)	-6.2%
Puvurnaq	-7.9%
Saint George	-8.3%
Yakutat	-9.7%
Venetie	-18.5%
Saint Paul	-22.2%
Chignik Lagoon	-31.3%
Atka	-44.2%
Port Heiden	-50.5%
Manokotak	-61.2%
Akiak	-65.2%

Hub Community Utilities	Net Margin
Cordova	11.7%
Nushagak Co-op	2.4%
Kotzebue	2.0%
Nome	-10.5%

Multi-Community Utilities	Net Margin
APC	24.1%
Illiamna, N, N	18.5%
Inside Passage	12.2%
Middle Kuskokwim	-23.7%
North Slope Borough	-156.2%

Average PCE Payments as a % of Total Revenue (2013-2016)

Micro-Single Utilities	PCE as a % of Total Revenue
Ungusraq (Newtok)	77%
Akhiok	48%
Napakiak	44%
Nikolai	42%
Chenega	38%
Chignik Lake	38%
Kokhanok	37%
Tenakee Springs	37%
Tatitlek	34%
Koyukuk	33%
Igiugig	33%
Nelson Lagoon	31%
Lime Village	29%
Atmautluak	27%
Circle	27%
Pilot Point	27%
Takotna	25%
Levelock	25%
Arctic Village	25%
Twin Hills	24%
Umnak	24%
Beaver	23%
Karluk	23%
Pedro Bay	23%
Chitina	19%
Clarks Point	18%
Elfin Cove	14%
Perryville	12%

Small-Single Utilities	PCE as a % of Total Revenue
Kipnuk	43%
Atka	41%
Venetie	36%
Puvurnaq	32%
Pelican	31%
Tuntutuliak	30%
Chignik Lagoon	30%
Kwethluk	29%

Ruby	28%
Ouzinkie	28%
Kwigillingok	27%
Akiak	27%
Tanana	26%
Naterkaq (Chefornak)	26%
Deering	25%
Golovin	25%
Saint George	25%
Akiachak	24%
White Mountain	23%
Aniak	23%
Tanalian (Port Alsworth)	23%
Port Heiden	23%
Napaskiak	23%
Chignik	21%
Egegik	21%
Tuluksak	20%
McGrath	20%
Nunam Iqua	19%
Saint Paul	18%
Buckland	17%
Unalakleet	17%
Yakutat	16%
Manokotak	15%
Galena	10%
King Cove	10%
False Pass	7%
Akutan	5%
Larsen Bay	4%

Hub Community Utilities	PCE as a % of Total Revenue
Kotzebue	16%
Nushagak Co-op	16%
Nome	12%
Cordova	9%

Multi-Community Utilities	PCE as a % of Total Revenue
Middle Kuskokwim	39%
Inside Passage	35%

Illiamna, N, N	14%
APC	6%
North Slope Borough	1%

Average Fuel Expenses as a % of Expenditures (2013-2016)

Micro-Single Utilities	Fuel as a % of Expenditures
Akhiok	44.8%
Arctic Village	41.9%
Atmautluak	60.9%
Beaver	100.1%
Chenega	65.1%
Chignik Lake	54.1%
Chitina	69.9%
Circle	47.3%
Clarks Point	60.8%
Elfin Cove	68.2%
Hughes	53.2%
Igiugig	73.8%
Karluk	66.5%
Kokhanok	62.5%
Koyukuk	68.2%
Levelock	72.7%
Lime Village	74.8%
Nelson Lagoon	70.8%
Nikolai	86.1%
Pedro Bay	66.5%
Perryville	61.0%
Pilot Point	69.7%
Takotna	45.4%
Tatitlek	74.5%
Tatitlek	72.6%
Tenakee Springs	65.3%
Twin Hills	86.5%
Umnak	71.0%
Ungusraq (Newtok)	65.6%

Small-Single Utilities	Fuel as a % of Expenditures
Akiachak	70.0%
Akiak	58.4%
Akutan	29.2%
Aniak	55.5%
Atka	38.5%
Buckland	78.2%
Chignik	61.7%
Chignik Lagoon	58.8%
Deering	62.9%
Egegik	56.8%
False Pass	65.2%

Galena	694.1%[14]
Golovin	61.2%
King Cove	47.6%
Kipnuk	141.5%
Kwethluk	78.0%
Kwigillingok	71.9%
Larsen Bay	291.6%
Manokotak	31.5%
Manokotak	208.1%
McGrath	52.9%
Naknek	85.5%
Napaskiak	57.9%
Naterkaq (Chefornak)	90.7%
Nunam Iqua	68.4%
Ouzinkie	56.6%
Pelican	46.4%
Port Heiden	55.7%
Puvurnaq	57.4%
Ruby	59.1%
Saint George	71.1%
Saint Paul	52.9%
Tanalian (Port Alsworth)	72.5%
Tanana	44.3%
Tuluksak	104.1%
Tuntutuliak	59.9%
Unalakleet	49.1%
Venetie	78.2%
White Mountain	59.2%
Yakutat	54.2%

Hub Community Utilities	Fuel as a % of Expenditures
Cordova	30.2%
Kotzebue	52.8%
Nome	50.0%
Nushagak Co-op	54.1%
Unalaska	39.8%

Multi-Community Utilities	Fuel as a % of Expenditures
APC	15.0%
Illiamna, N, N	1.3%
Inside Passage	52.4%

[14] Note: Galena's Fuel as a% of expenditures is so high due to improper accounting. In 2013, their total expenditures reported were much lower than other reported years. This produced a percentage that was well in excess of 100%.

Middle Kuskokwim	43.5%
North Slope Borough	40.5%

Average Expense Breakdown as Percent of Total Expenditure (2013-2016)

Micro-Single **Utilities**	G&A Expenses %	Personnel Expenses %	Operating Expenses %
Akhiok	10.6%	7.2%	82.1%
Arctic Village	6.7%	16.6%	72.6%
Atmautluak	8.1%	25.6%	66.6%
Beaver	6.3%	40.2%	79.6%
Chenega	6.9%	9.4%	78.9%
Chignik Lake	7.5%	14.8%	82.4%
Chitina	11.0%	19.2%	72.0%
Circle	11.1%	31.8%	58.6%
Clarks Point	10.0%	12.2%	74.2%
Elfin Cove	8.8%	35.7%	55.5%
Igiugig	4.2%	9.3%	67.9%
Karluk	1.5%	29.6%	68.0%
Kokhanok	6.7%	26.6%	64.6%
Koyukuk	5.2%	15.2%	76.6%
Levelock	2.6%	33.0%	74.0%
Lime Village	27.1%	26.8%	63.6%
Napakiak	12.0%	14.3%	63.7%
Nelson Lagoon	5.7%	25.3%	66.2%
Nikolai	1.9%	11.2%	86.9%
Pedro Bay	3.2%	11.9%	70.7%
Perryville	12.1%	28.3%	55.2%
Pilot Point	3.0%	11.6%	69.7%
Takotna	1.8%	17.0%	80.4%
Tatitlek	5.3%	35.1%	59.7%
Tatitlek	9.4%	18.5%	69.4%
Tenakee Springs	9.8%	21.5%	68.7%
Twin Hills	0.2%	15.2%	83.8%
Umnak	10.2%	7.3%	79.2%
Ungusraq (Newtok)	2.6%	18.0%	77.3%

Small-Single Utilities	G&A Expenses %	Personnel Expenses %	Operating Expenses %
Akiachak	16.3%	24.6%	25.4%
Akiak	18.2%	16.7%	64.9%
Akutan	7.6%	34.9%	34.0%
Atka	5.7%	16.5%	52.2%
Buckland	7.4%	4.2%	92.6%
Chignik	6.2%	22.0%	65.2%

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Chignik Lagoon	4.0%	11.2%	84.8%
Deering	10.3%	20.5%	68.4%
Egegik	13.2%	15.4%	60.4%
False Pass	4.2%	6.6%	61.9%
Galena	2.6%	19.2%	69.8%
Golovin	3.6%	19.6%	85.0%
King Cove	1.8%	22.1%	52.9%
Kwethluk	3.9%	16.3%	79.8%
Larsen Bay	38.2%	36.9%	50.7%
Manokotak	12.0%	0.7%	75.0%
Naknek	18.5%	6.7%	42.1%
Napaskiak	2.5%	2.2%	77.9%
Naterkaq (Chefornak)	5.7%	11.5%	81.4%
Nunam Iqua	9.3%	9.9%	78.1%
Ouzinkie	6.3%	29.3%	60.8%
Pelican	9.5%	47.2%	43.1%
Port Heiden	6.3%	12.9%	77.2%
Puvurnaq	12.6%	22.8%	79.9%
Ruby	18.4%	33.5%	63.4%
Saint George	5.5%	18.1%	72.9%
Saint Paul	8.5%	7.2%	67.6%
Tanalian (Port Alsworth)	14.7%	11.8%	77.9%
Tuluksak	7.8%	28.0%	60.7%
Tuntutuliak	6.7%	26.8%	66.5%
Unalakleet	20.2%	49.9%	54.0%
Venetie	6.7%	18.6%	72.5%
White Mountain	4.8%	25.4%	69.6%
Yakutat	5.6%	25.1%	69.9%

Hub Community **Utilities**	G&A Expenses %	Personnel Expenses %	Operating Expenses %
Cordova	15.4%	17.1%	64.4%
Nome	8.9%	10.8%	60.2%
Nushagak Co-op	10.3%	9.2%	73.5%

Multi-Community Utilities	G&A Expenses %	Personnel Expenses %	Operating Expenses %
Illiamna, N, N	23.8%	19.6%	19.0%
Middle Kuskokwim	7.1%	18.4%	87.8%

Average Generation Unit Cost (2013-2016)

Micro-Single Utilities	Generation Unit Cost ($/kWh)
Tatitlek	$3.00
Arctic Village	$1.86
Takotna	$1.19
Akhiok	$1.17
Lime Village	$1.16
Chignik Lake	$0.91
Hughes	$0.85
Umnak	$0.84
Clarks Point	$0.84
Twin Hills	$0.82
Pedro Bay	$0.80
Kokhanok	$0.76
Igiugig	$0.73
Circle	$0.71
Chenega	$0.68
Nelson Lagoon	$0.68
Nikolai	$0.66
Ungusraq (Newtok)	$0.64
Koyukuk	$0.63
Beaver	$0.63
Karluk	$0.62
Tatitlek	$0.60
Elfin Cove	$0.60
Levelock	$0.60
Pilot Point	$0.59
Tenakee Springs	$0.55
Atmautluak	$0.51
Chitina	$0.48
Perryville	$0.39

Small-Single Utilities	Generation Unit Cost ($/kWh)
Manokotak	$1.72
Akutan	$0.98
Port Heiden	$0.81
Saint George	$0.78
Atka	$0.75
Venetie	$0.71
Egegik	$0.70
Napaskiak	$0.67
Chignik Lagoon	$0.66
Saint Paul	$0.66
Akiak	$0.66
Tanana	$0.65

Deering	$0.65
McGrath	$0.60
Tanalian (Port Alsworth)	$0.57
Tuntutuliak	$0.57
Aniak	$0.57
Ruby	$0.56
White Mountain	$0.52
Tuluksak	$0.50
Yakutat	$0.49
Golovin	$0.48
Chignik	$0.46
Naterkaq (Chefornak)	$0.46
Nunam Iqua	$0.46
Akiachak	$0.45
False Pass	$0.45
Puvurnaq	$0.43
Kwigillingok	$0.43
Buckland	$0.42
Kwethluk	$0.41
Ouzinkie	$0.41
Unalakleet	$0.40
Pelican	$0.34
Naknek	$0.27
King Cove	$0.27
Galena	$0.25
Kipnuk	$0.21
Larsen Bay	$0.08

Hub Community Utilities	Generation Unit Cost ($/kWh)
Unalaska	$0.66
Nushagak Co-op	$0.44
Nome	$0.41
Kotzebue	$0.38
Cordova	$0.26

Multi-Community Utilities	Generation Unit Cost ($/kWh)
APC	$1.56
Middle Kuskokwim	$1.29
North Slope Borough	$0.83
Inside Passage	$0.47
Illiamna, N, N	$0.28

Average Operating Expense per kWh Generated (2013-2016)

Micro-Single Utilities	Operating Expenses per kWh Generated ($/kWh)
Arctic Village	$1.93
Tatitlek	$1.48
Akhiok	$0.97
Takotna	$0.96
Lime Village	$0.76
Twin Hills	$0.71
Chignik Lake	$0.70
Umnak	$0.66
Igiugig	$0.65
Clarks Point	$0.62
Pedro Bay	$0.58
Nikolai	$0.57
Kokhanok	$0.51
Chenega	$0.51
Koyukuk	$0.48
Ungusraq (Newtok)	$0.48
Pilot Point	$0.45
Nelson Lagoon	$0.44
Circle	$0.43
Karluk	$0.42
Tatitlek	$0.42
Levelock	$0.39
Tenakee Springs	$0.39
Chitina	$0.35
Atmautluak	$0.34
Beaver	$0.32
Perryville	$0.29
Elfin Cove	$0.28

Small-Single Utilities	Operating Expenses per kWh Generated ($/kWh)
Manokotak	$1.40
Tanana	$0.65
Port Heiden	$0.62
Saint George	$0.57
Chignik Lagoon	$0.56
Venetie	$0.54
Galena	$0.51
Tanalian (Port Alsworth)	$0.48
Akiak	$0.48
Deering	$0.46
Egegik	$0.44

Saint Paul	$0.43
Napaskiak	$0.43
Buckland	$0.39
Aniak	$0.39
Naterkaq (Chefornak)	$0.38
Golovin	$0.38
Akutan	$0.38
Tuntutuliak	$0.38
White Mountain	$0.36
Nunam Iqua	$0.36
Ruby	$0.36
Kwethluk	$0.34
Puvurnaq	$0.34
Atka	$0.31
Chignik	$0.30
Yakutat	$0.30
Tuluksak	$0.29
False Pass	$0.28
Ouzinkie	$0.27
Unalakleet	$0.21
Pelican	$0.20
Kipnuk	$0.20
King Cove	$0.16
Akiachak	$0.13
Naknek	$0.12
Larsen Bay	$0.08
McGrath	-$0.01

Hub Community Utilities	Operating Expenses per kWh Generated ($/kWh)
Nushagak Co-op	$0.32
Kotzebue	$0.28
Nome	$0.24
Cordova	$0.17

Multi-Community Utilities	Operating Expenses per kWh Generated ($/kWh)
Middle Kuskokwim	$1.10
APC	$0.89
Inside Passage	$0.44
AVEC	$0.36
Illiamna, N, N	$0.16

Average Annual kWh Produced (PCE Eligible) per Household and Community Facility (2013-2016)

Micro-Single Utilities	Annual kWh Produced (PCE Eligible) per Household	Annual kWh Produced (PCE Eligible) per Community Facility
Akhiok	2,271	84
Arctic Village	1,331	3,985
Atmautluak	3,831	4,069
Beaver	2,292	0
Chenega Bay	3,434	6,979
Chignik Lake	2,965	2,349
Chitina	2,303	7,452
Circle	2,960	2,462
Clarks Point	3,264	0
Elfin Cove	1,261	1,773
Hughes	3,959	22,750
Igiugig	3,197	3,508
Karluk	4,429	8,414
Kokhanok	3,083	6,583
Koyukuk	1,404	4,841
Levelock	3,393	3,877
Lime Village	795	2,946
Napakiak	3,231	9,469
Nelson Lagoon	3,142	5,765
Newtok (Ungusraq)	3,754	11,090
Nikolai	3,573	7,373
Pedro Bay	2,246	4,283
Perryville	2,335	0
Pilot Point	2,390	5,763
Takotna	2,323	5,324
Tatitlek	1,841	11,550
Tenakee Springs	1,548	2,091
Twin Hills	3,348	6,945
Umnak	3,467	3,570

Small-Single Utilities	Annual kWh Produced (PCE Eligible) per Household	Annual kWh Produced (PCE Eligible) per Community Facility
Akiachak	3,400	15,773
Akiak	3,013	3,672
Akutan	3,829	5,698
Aniak	4,050	26,623

Atka	4,381	14,944
Buckland	4,502	3,409
Central (Gold Country Energy)	1,857	4,879
Chefornak (Naterkaq)	3,833	14,059
Chignik	2,604	7,573
Chignik Lagoon	2,710	6,775
Deering	3,722	14,752
Egegik	1,826	5,384
False Pass	2,813	2,893
Galena	3,171	43,677
Golovin	3,882	10,392
King Cove	3,831	24,926
Kipnuk	3,892	3,547
Kwethluk	3,270	10,199
Kwigillingok	4,157	25,060
Larsen Bay	2,575	7,626
Manokotak	3,215	1,774
McGrath	2,918	16,960
Naknek	2,541	20,378
Napaskiak	3,488	3,495
Nunam Iqua	4,082	48,406
Ouzinkie	3,457	10,939
Pelican	2,551	1,812
Port Alsworth (Tanalian)	3,405	
Port Heiden	3,053	9,232
Puvurnaq	4,089	16,865
Ruby	2,096	4,802
Saint George	3,036	5,963
Saint Paul	4,522	12,524
Tanana	2,665	19,249
Tuluksak	2,177	4,435
Tuntutuliak	4,090	3,421
Unalakleet	3,494	22,715
Venetie	2,028	8,908
White Mountain	3,255	12,134
Yakutat	3,691	11,732

Hub Community Utilities	Annual kWh Produced (PCE Eligible) per Household	Annual kWh Produced (PCE Eligible) per Community Facility
Cordova	4,090	32,423
Dillingham (Nushagak Co-op)	4,124	17,642
Kotzebue	3,596	56,470
Nome	3,237	27,174
Unalaska	2,645	52,204

Multi-Community Utilities	Annual kWh Produced (PCE Eligible) per Household	Annual kWh Produced (PCE Eligible) per Community Facility
APC	3,368	16,534
AVEC	3,996	18,194
Illiamna, N, N	2,841	23,250
Inside Passage	3,433	17,620
Middle Kuskokwim	2,918	16,960
North Slope Borough	2,706	27,967

Average Generator Efficiency (2013-2016)

Micro-Single Utilities	Generator Efficiency (kWh/gal)
Perryville	17.57
Atmautluak	14.04
Hughes	13.79
Tatitlek	12.90
Tenakee Springs	12.86
Tatitlek	12.07
Chitina	12.05
Elfin Cove	12.01
Chenega	11.99
Arctic Village	11.76
Igiugig	11.71
Levelock	11.29
Pilot Point	11.15
Karluk	11.10
Circle	10.85
Nikolai	10.77
Chignik Lake	10.53
Kokhanok	10.36
Pedro Bay	10.27
Ungusraq (Newtok)	10.26
Nelson Lagoon	10.19
Takotna	10.17
Umnak	10.15
Akhiok	9.68
Lime Village	9.61
Koyukuk	9.56
Beaver	8.75
Clarks Point	7.55
Twin Hills	6.77

Small-Single Utilities	Generator Efficiency (kWh/gal)
Naknek	15.63
Yakutat	14.86
Unalakleet	14.65
McGrath	14.51
Akiak	14.45
Akiachak	14.20
King Cove	14.18
Saint Paul	14.10
Napaskiak	14.05
Kipnuk	13.95
Buckland	13.48
Naterkaq (Chefornak)	13.46

Chignik	13.46
Kwigillingok	13.32
Kwethluk	13.30
Galena	13.30
Ruby	13.27
Pelican	13.26
Saint George	13.23
Tanana	13.15
Ouzinkie	13.09
Golovin	12.88
False Pass	12.83
Aniak	12.81
Nunam Iqua	12.53
Puvurnaq	12.40
Tanalian (Port Alsworth)	12.21
Akutan	12.10
White Mountain	12.02
Central (Gold Country Energy)	11.92
Egegik	11.74
Deering	11.48
Larsen Bay	10.57
Chignik Lagoon	10.37
Tuluksak	10.13
Tuntutuliak	10.04
Venetie	9.89
Atka	9.25
Manokotak	7.71
Port Heiden	7.38

Hub Community Utilities	Generator Efficiency (kWh/gal)
Nome	16.05
Unalaska	15.80
Nushagak Co-op	15.05
Kotzebue	14.37
Cordova	13.27

Multi-Community Utilities	Generator Efficiency (kWh/gal)
Illiamna, N, N	15.69
Inside Passage	14.37
APC	13.55
AVEC	13.53
North Slope Borough	12.95
Middle Kuskokwim	8.35

Average Line Loss (2013-2016)

Micro-Single Utilities	Line Loss
Lime Village	26%
Perryville	25%
Arctic Village	24%
Levelock	19%
Akhiok	19%
Koyukuk	18%
Igiugig	14%
Hughes	14%
Nikolai	14%
Atmautluak	14%
Nelson Lagoon	13%
Clarks Point	13%
Tenakee Springs	12%
Takotna	12%
Tatitlek	11%
Pilot Point	11%
Circle	10%
Pedro Bay	10%
Karluk	9%
Elfin Cove	9%
Chignik Lake	8%
Twin Hills	7%
Chenega	7%
Kokhanok	7%
Beaver	7%
Napakiak	7%
Chitina	7%
Umnak	6%
Ungusraq (Newtok)	5%

Small-Single Utilities	Line Loss
Puvurnaq	23%
Ruby	22%
Galena	20%
Napaskiak	19%
Chignik Lagoon	19%
Naterkaq (Chefornak)	18%
Venetie	18%
Central (Gold Country Energy)	17%
Saint George	16%
Pelican	15%
King Cove	14%
Kwigillingok	14%

Aniak	13%
Manokotak	12%
Tuluksak	12%
False Pass	12%
Akutan	12%
Saint Paul	11%
Chignik	11%
Kwethluk	11%
Atka	11%
Yakutat	10%
Akiak	9%
Tuntutuliak	9%
Akiachak	8%
McGrath	7%
Larsen Bay	7%
Egegik	7%
Deering	7%
White Mountain	7%
Naknek	7%
Ouzinkie	7%
Kipnuk	7%
Tanalian (Port Alsworth)	6%
Tanana	6%
Unalakleet	6%
Buckland	6%
Golovin	5%
Nunam Iqua	5%

Hub Community Utilities	Line Loss
Kotzebue	6%
Cordova	6%
Nome	5%
Nushagak Co-op	4%
Unalaska	3%

Multi-Community Utilities	Line Loss
APC	19%
Inside Passage	14%
Middle Kuskokwim	12%
Illiamna, N, N	11%
AVEC	8%
North Slope Borough	7%

Average Payroll Expenditure per kWh (2013-2016)

Micro-Single Utilities	Payroll Expenditure per kWh ($/kWh)
Lime Village	$0.29
Elfin Cove	$0.27
Arctic Village	$0.24
Circle	$0.23
Beaver	$0.21
Takotna	$0.20
Karluk	$0.18
Kokhanok	$0.18
Nelson Lagoon	$0.17
Chignik Lake	$0.14
Atmautluak	$0.13
Ungusraq (Newtok)	$0.13
Hughes	$0.13
Tenakee Springs	$0.12
Tatitlek	$0.11
Levelock	$0.10
Clarks Point	$0.10
Pilot Point	$0.10
Koyukuk	$0.10
Twin Hills	$0.09
Chitina	$0.09
Pedro Bay	$0.09
Akhiok	$0.09
Nikolai	$0.07
Chenega	$0.07
Umnak	$0.06
Igiugig	$0.05
Perryville	$0.04

Small-Single Utilities	Payroll Expenditure per kWh ($/kWh)
Akutan	$0.31
Ruby	$0.22
Unalakleet	$0.19
Tuntutuliak	$0.15
Saint George	$0.15
Tuluksak	$0.14
White Mountain	$0.13
Yakutat	$0.12
Akiak	$0.12
Pelican	$0.12
Venetie	$0.12
Port Heiden	$0.12

Deering	$0.11
Kwigillingok	$0.11
Puvurnaq	$0.11
Egegik	$0.11
Akiachak	$0.10
Atka	$0.10
Chignik	$0.10
Ouzinkie	$0.10
Kipnuk	$0.09
Galena	$0.08
Golovin	$0.08
Chignik Lagoon	$0.08
Kwethluk	$0.07
Aniak	$0.06
King Cove	$0.05
Saint Paul	$0.05
Nunam Iqua	$0.05
Naterkaq (Chefornak)	$0.04
False Pass	$0.04
Tanalian (Port Alsworth)	$0.03
Larsen Bay	$0.03
Naknek	$0.02
Buckland	$0.01
Napaskiak	$0.01
Manokotak	$0.01

Hub Community Utilities	Payroll Expenditure per kWh ($/kWh)
Unalaska	$0.06
Nome	$0.04
Cordova	$0.04
Nushagak Co-op	$0.04

Multi-Community Utilities	Payroll Expenditure per kWh ($/kWh)
APC	$0.50
Middle Kuskokwim	$0.31
Inside Passage	$0.09
Illiamna, N, N	$0.06
AVEC	$0.02

Average Debt to Equity Ratio (2013-2016)

Micro-Single Utilities	Debt to Equity Ratio
Circle	4.85
Atmautluak	2.98
Napakiak	2.47
Pilot Point	1.00
Pedro Bay	0.87
Koyukuk	0.85
Nelson Lagoon	0.67
Perryville	0.50
Twin Hills	0.45
Igiugig	0.09
Tenakee Springs	0.01
Chitina	0.00
Karluk	(2.00)
Clarks Point	(5.01)
Levelock	(16.90)

Small-Single Utilities	Debt to Equity Ratio
Akiachak	5.47
Naterkaq (Chefornak)	2.98
Buckland	2.53
Tanana	1.04
Kwethluk	1.00
Tanalian (Port Alsworth)	1.00
Golovin	0.65
Chignik	0.62
Manokotak	0.49
Galena	0.43
Tuluksak	0.38
Akutan	0.31
Napaskiak	0.30
Unalakleet	0.24
Aniak	0.20
Nunam Iqua	0.15
Yakutat	0.15
Atka	0.12
Kwigillingok	0.11
Puvurnaq	0.07
Ruby	0.05
Chignik Lagoon	0.02
Ouzinkie	0.00
Port Heiden	(0.03)
Deering	(0.92)
Saint George	(1.46)

Tuntutuliak	(2.60)
Kipnuk	(2.93)
Egegik	(15.75)

Hub Community Utilities	Debt to Equity Ratio
Cordova	1.16
Nushagak Co-op	0.90
Kotzebue	0.83
Nome	0.24

Multi-Community Utilities	Debt to Equity Ratio
Middle Kuskokwim	3.04
Illiamna, N, N	1.17
Inside Passage	0.21
APC	0.05

Average Accounts Receivable Days (2013-2016)

Micro-Single Utilities	Accounts Receivable Days
Levelock	373.04
Arctic Village	281.98
Akhiok	269.01
Lime Village	250.03
Beaver	206.66
Twin Hills	101.40
Pedro Bay	72.70
Elfin Cove	61.50
Chitina	60.83
Circle	60.49
Pilot Point	51.48
Tenakee Springs	45.19
Igiugig	44.16
Karluk	44.02
Ungusraq (Newtok)	40.45
Umnak	31.66
Napakiak	27.66
Chenega	14.69
Kokhanok	12.58

Small-Single Utilities	Accounts Receivable Days
Kipnuk	244.93
Manokotak	156.53
Buckland	155.19
Puvurnaq	123.63
Manokotak	121.66
Tanana	98.57
Akiachak	97.93
Venetie	68.94
Yakutat	58.66
Unalakleet	56.19
Golovin	55.53
McGrath	54.02
Ouzinkie	46.67
Saint Paul	44.34
Pelican	43.25
Kwigillingok	38.73
Kwethluk	36.61
Aniak	28.57

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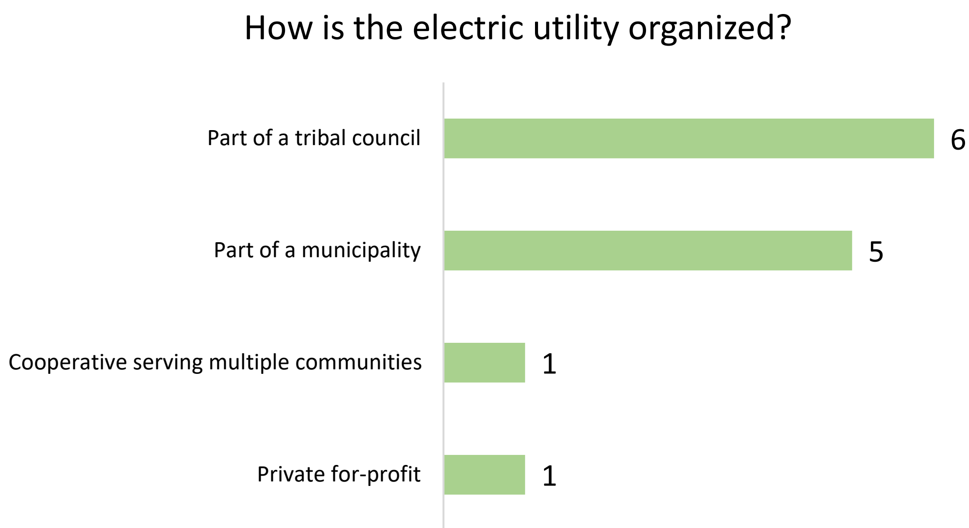
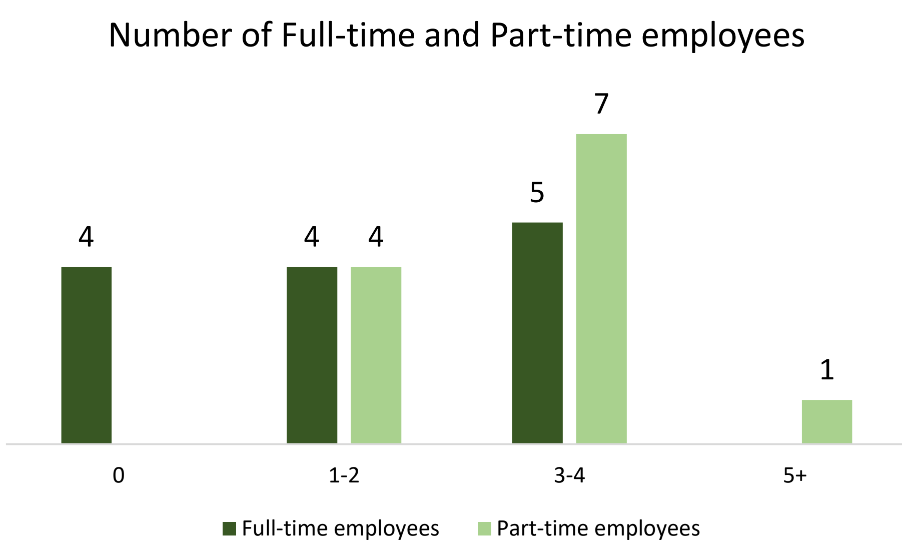
Tanalian (Port Alsworth)	28.38
Nunam Iqua	27.12
Tuntutuliak	26.30
Ruby	22.74
King Cove	14.51
Egegik	8.75
Akutan	4.94
Port Heiden	2.14
Galena	0.65
Chignik Lagoon	-1.90
Tuluksak	-5.22
Deering	-27.34

Hub Community Utilities	Accounts Receivable Days
Kotzebue	79.66
Nushagak Co-op	69.38
Nome	47.20
Cordova	20.83

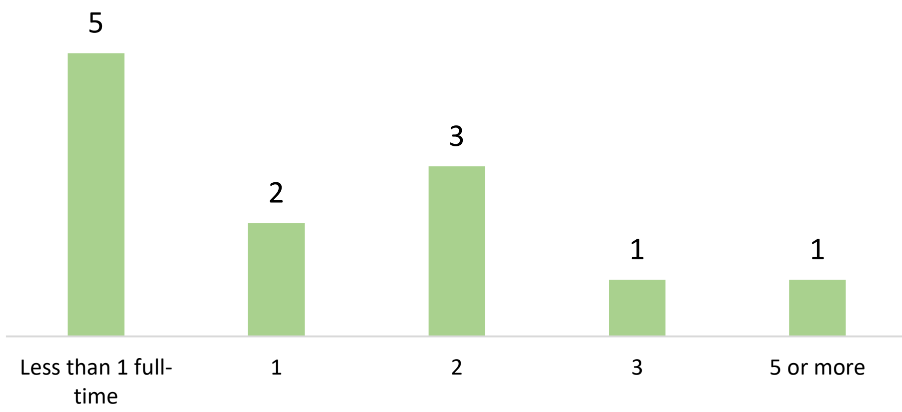
Multi-Community Utilities	Accounts Receivable Days
Middle Kuskokwim	77.19
APC	46.74
Illiamna, N, N	39.59
Inside Passage	39.33
North Slope Borough	1.98

Survey Results

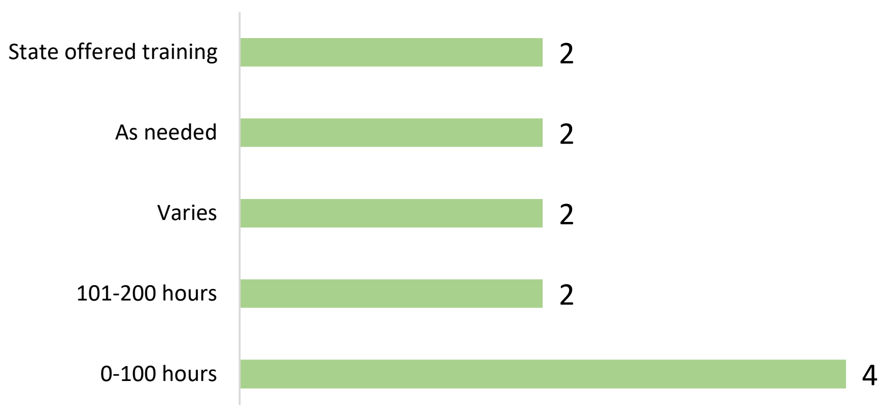


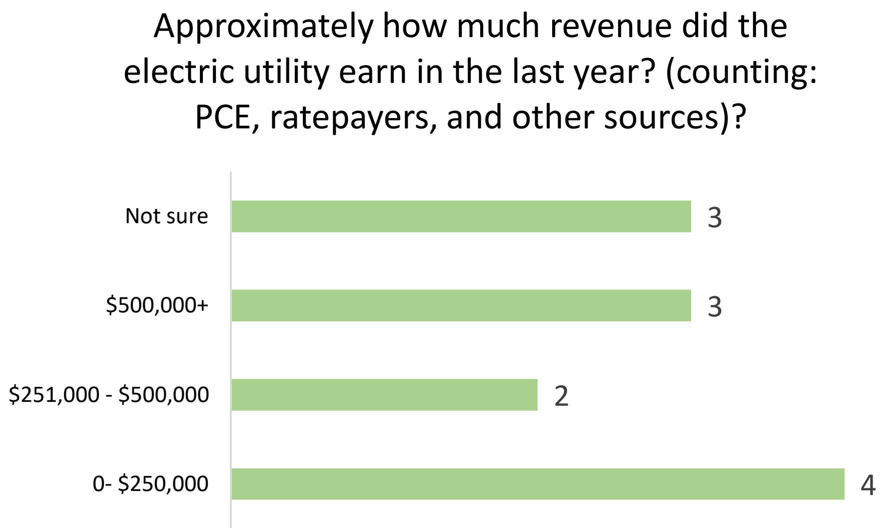


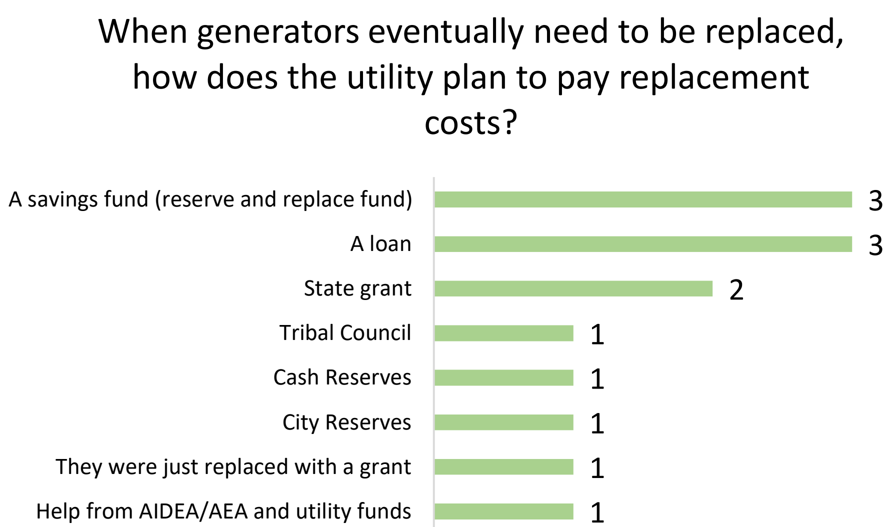
How many dedicated maintenance people does the utility have on staff?

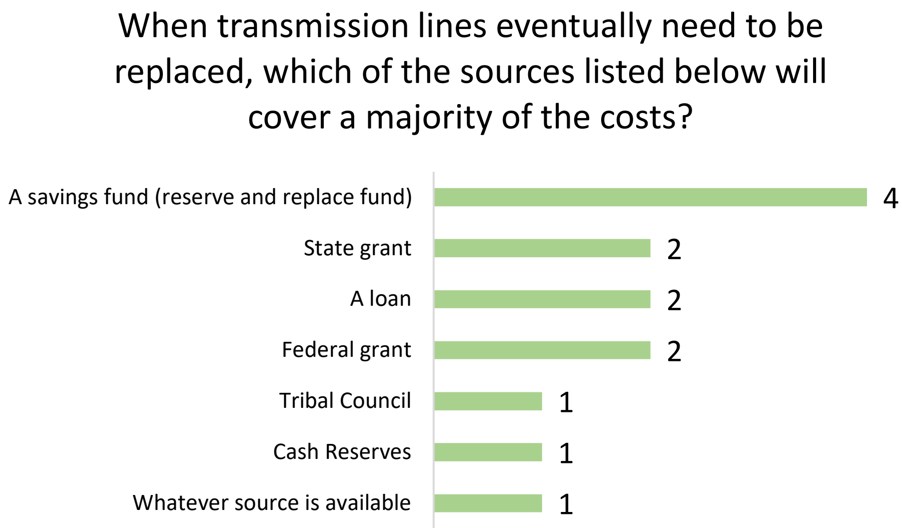


If the utility offers employee training, how many hours per year?

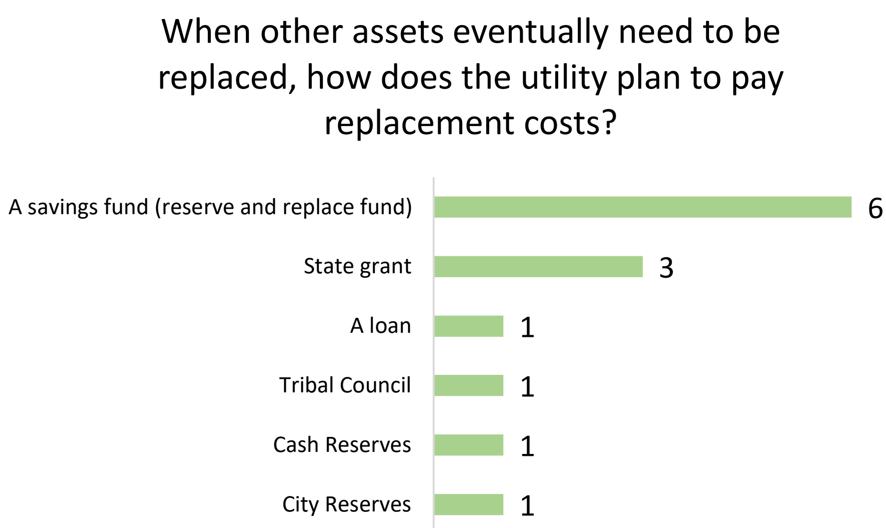



Approximately how much revenue did the electric utility earn in the last year? (counting: PCE, ratepayers, and other sources)?
Not sure
3
$500,000+
3
$251,000 - $500,000
2
0- $250,000
4

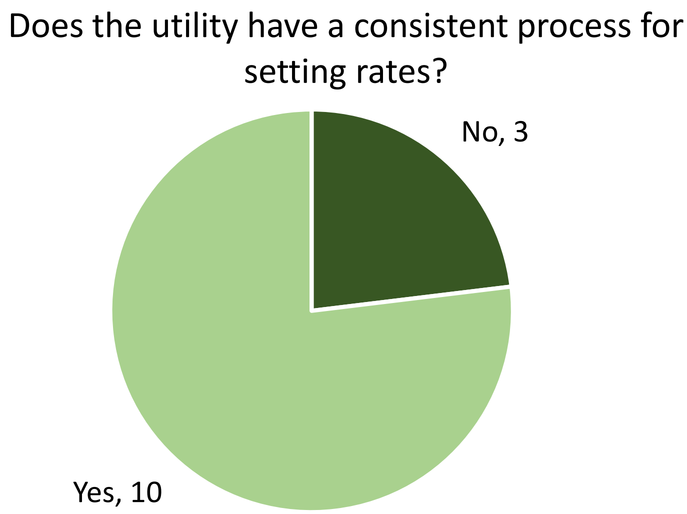

When generators eventually need to be replaced, how does the utility plan to pay replacement costs?
A savings fund (reserve and replace fund)
3
A loan
3
State grant
2
Tribal Council
1
Cash Reserves
1
City Reserves
1
They were just replaced with a grant
1
Help from AIDEA/AEA and utility funds
1



When transmission lines eventually need to be replaced, which of the sources listed below will cover a majority of the costs?
A savings fund (reserve and replace fund)
4
State grant
2
A loan
2
Federal grant
2
Tribal Council
1
Cash Reserves
1
Whatever source is available
1



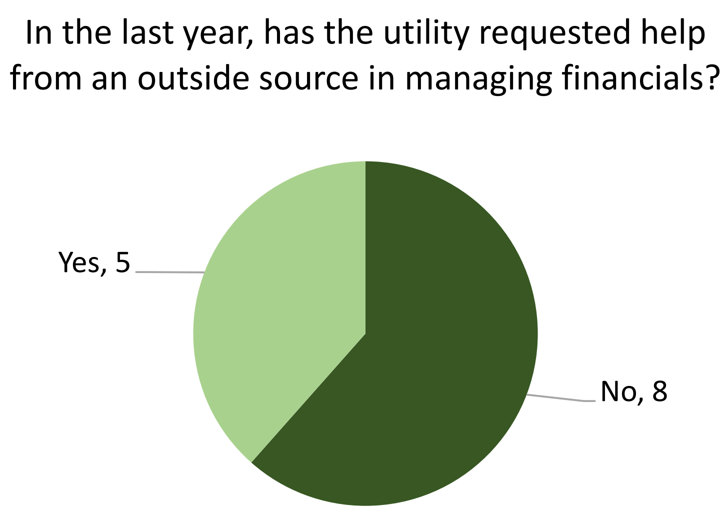
When other assets eventually need to be replaced, how does the utility plan to pay replacement costs?
A savings fund (reserve and replace fund)
6
State grant
3
A loan
1
Tribal Council
1
Cash Reserves
1
City Reserves
1



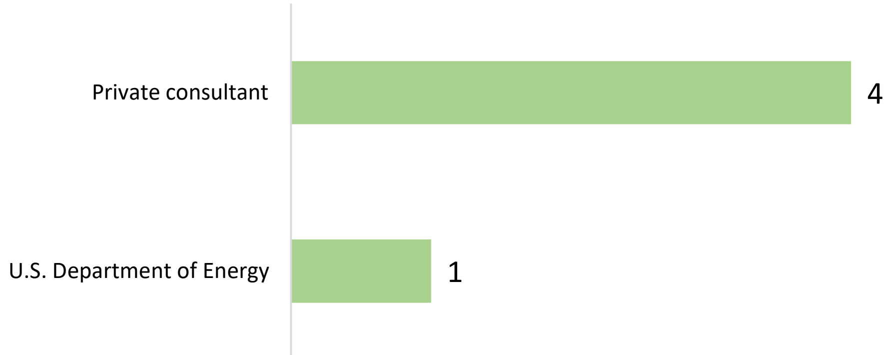
Can you briefly describe how rates are calculated?

The answers included the following:

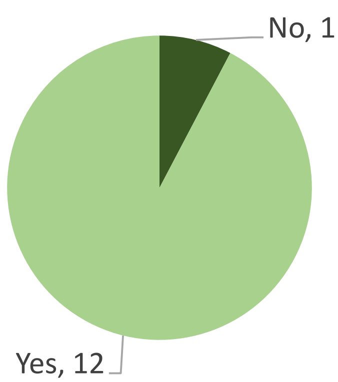
- Rate setting/analysis (3)
- Dependent on PCE subsidies and/or fuel costs (3)
- Based on budget, to ensure rates cover expenditures (2)

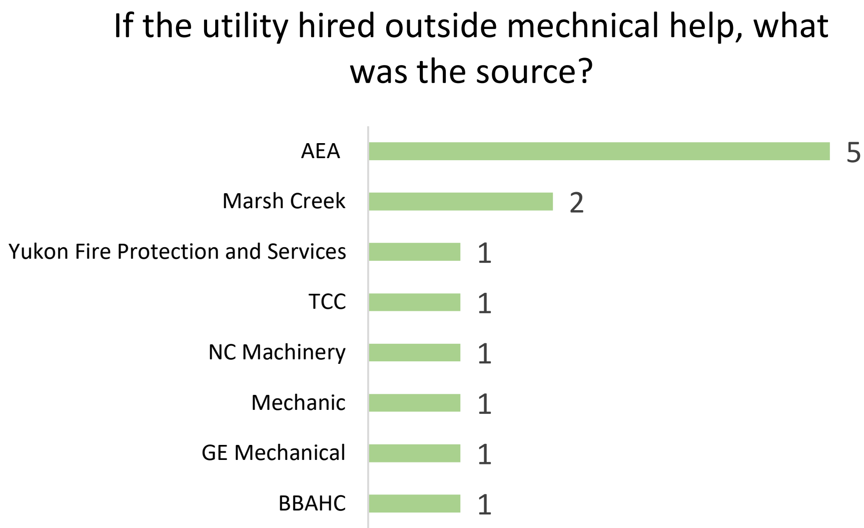


If the utility requested help from an outside source in managing financials, what was the source?

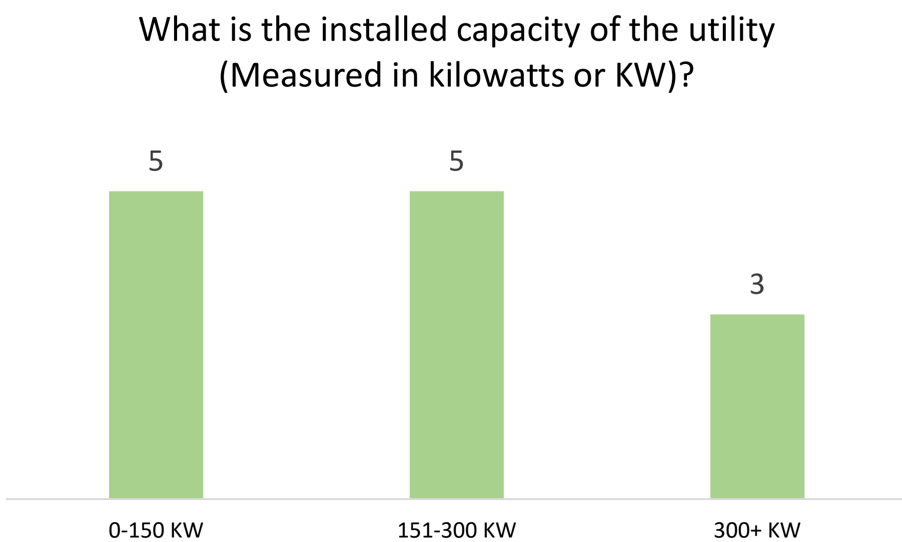


In the last year, has the utility requested assistance from outside the community to fix a mechanical problem?





All respondents reported that they have and use a maintenance checklist.



Appendix C: Survey Questionnaire

1. **Are you the primary manager of the electric utility?**
    a. Yes
    b. No
2. **What is the name of the utility?**
3. **What is your job title?**
4. **How is the electric utility organized?**
    a. Cooperative serving one community
    b. Cooperative serving multiple communities
    c. Part of a tribal council
    d. Part of a municipality
    e. Private for-profit
    f. Other
5. **How many full-time employees work for the utility?**
6. **How many part-time employees work for the utility?**
7. **How many dedicated maintenance people does the utility have on staff?**
    a. Less than 1 full-time
    b. 1
    c. 2
    d. 3
    e. 4
    f. 5 of more
8. **Does the utility provide employee training?**
    a. Yes
    b. No
9. **If so, how many hours per year?**
10. **Overall, my knowledge and comfort level with the utility's financials is:**
    a. Very high
    b. Somewhat high
    c. Somewhat low
    d. Very low
11. **Approximately how much revenue did the electric utility earn in the last year? (counting: PCE, ratepayers, and other sources)?**
12. **In the last three years has the utility borrowed money to cover expenses?**
    a. Yes
    b. No
13. **If the utility has borrowed money in the last three years, what was the source? (check all that apply)**
    a. Bulk Fuel Loan (Alaska Division of Community and Regional Affairs)
    b. Power Project Loan Fund (Alaska Energy Authority)

c. USDA loan
d. Private bank or credit union
e. Loan from another organization (such as a: city, tribe, village corporation, or other entity)
f. Not applicable
g. CDFI
h. Other:

14. In the last two years, has the utility received grant funding or monetary assistance, besides PCE?

a. Yes
b. No

15. If so, who provided the funding? (Check all that apply)

a. State revenue sharing
b. Local government (other than revenue sharing)
c. Federal grants
d. Tribal funds
e. State of Alaska capital grants
f. Denali Commission
g. Village or regional corporation
h. CDQ
i. Other:

16. Does the utility have a dedicated reserve and replace fund?

a. Yes
b. No

17. When generators eventually need to be replaced, how does the utility plan to pay replacement costs?

a. Federal grant
b. State grant
c. A loan
d. A savings fund (reserve and replace fund)
e. Other:

18. When transmission lines eventually need to be replaced, which of the sources listed below will cover a majority of the costs.

a. Federal grant
b. State grant
c. A loan
d. A savings fund (reserve and replace fund)
e. Other:

19. **When other assets eventually need to be replaced, how does the utility plan to pay replacement costs?**
    a. Federal grant
    b. State grant
    c. A loan
    d. A savings fund (reserve and replace fund)
    e. Other:
20. **Does the utility have a consistent process for setting rates?**
    a. Yes
    b. No
21. **If so, can you briefly describe how rates are calculated?**
22. **In the last year, has the utility requested help from an outside source in managing financials?**
    a. Yes
    b. No
23. **If so, what was the source?**
    a. Alaska Energy Authority
    b. U.S. Department of Energy
    c. Alaska Division of Community and Regional Affairs
    d. Private consultant
    e. Other:
24. **In the last year, has the utility requested assistance from outside the community to fix a mechanical problem?**
    a. Yes
    b. No
25. **If so, what was the source?**
26. **Does the utility have a maintenance checklist or schedule?**
    a. Yes
    b. No
27. **What is the installed capacity of the utility (Measured in kilowatts or KW)**
28. **In the last year, how many power outages has the utility had?**
    a. 0-3
    b. 3-7
    c. 7-10
    d. 10-20
    e. 20+
    f. Not sure
    g. Other
29. **What are the three greatest challenges facing the utility?**
    a. Ensuring quality power
    b. Finances
    c. Bill collections
    d. Reserve and Replace funds
    e. Future replacement of infrastructure
    f. Operations

g. Maintenance
h. Regulatory compliance
i. Adequately training personnel
j. Retraining personnel
k. Other:

30. What information or data will help you be more effective in decision making for the utility? (Rate each as: very desirable, desirable, or undesirable)

Efficiency (gallons per kWh)
Line Loss
Smart meters/other similar technology
Expected vs. actual performance of generation infrastructure
Investment opportunities to increase reliability
Investment opportunities for reducing customer costs
Efficiency (gallons per kWh)
Line Loss
Smart meters/other similar technology
Expected vs. actual performance of generation infrastructure
Investment opportunities to increase reliability
Investment opportunities for reducing customer costs

31. If an advice/assistance program was developed, the following types of assistance would be useful: (Rate each as: very desirable, desirable, undesirable)

Regulatory reporting
Accounting/financial management
Budgeting for capital improvements
Calculating rates
Employee training: bookkeeping
Billing customers
Routine maintenance (rebuilds, fixing outages, etc.)
Planning for routine maintenance
Employee training: generation
Regulatory reporting
Accounting/financial management
Budgeting for capital improvements
Calculating rates
Employee training: bookkeeping
Billing customers
Routine maintenance (rebuilds, fixing outages, etc.)
Planning for routine maintenance
Employee training: generation

32. Are there other types of assistance that would be desirable?

Appendix D: Meta Data

Forms in which data was found:

- **Annual Report:** As mentioned previously in the meta data section, Annual Reports are the abbreviated name for the Annual Power Cost Equalization Report for Nonregulated Utilities, that utilities file each year. Included in the Annual Reports are a variety of financial forms including: balance sheets and income statements.
- **Statistical Reports:** The Statistical Reports are the Annual PCE Statistical Reports generated by AEA, and can be found on the AEA website.
- **FERC-style forms:** As mentioned previously in the previous meta data section, there are eight utilities included in this analysis that file reports with the Federal Energy Regulatory Commission (FERC). The FERC forms are considered an acceptable format for the Annual Report by the RCA.

1. **Average Annual kWh produced (PCE eligible) per Household and Community Facility (from Statistical Reports):** The amount of kWh produced per household and community facility, taken from the Statistical Reports.
2. **Accounts payable:** Accounts payable can be found on the balance sheet form. Many utilities did not fill out the balance sheet form, and instead attached their own balance sheet at the end of the report.
3. **Accounts receivable:** Accounts receivable can be found on the balance sheet form.
4. **Annual Fuel Expenditures (from Statistical Reports):** The amount of fuel expenditures for each community.
5. **Annual PCE payments (from Statistical Reports):** The amount of PCE subsidy payments made to each utility.
6. **Breakdowns:** This is the number of breakdowns reported by the utility in their Annual Report.
7. **Cash:** Cash can be found on the balance sheet.
8. **Category name:** The category names were a taxonomy created to classify similar communities together.
9. **Community Facilities (from Statistical Reports):** The number of community facilities being served by the utility.
10. **Effective rate (from Statistical Reports):** This is the subsidized rate eligible residents pay for power up to the first 500 kWh, each month. This rate is calculated by the AEA, and is found by subtracting the PCE rate for a community from the residential rate for that community.
11. **Equity:** Equity can be found on the balance sheet.
12. **Fixed assets:** Fixed assets were usually found in the additional financial statements attached to the Annual Reports.
13. **Fuel Stock:** The amount of fuel the utility had on hand during the reporting period. This was broken out as it is considered an asset for many communities.
14. **General and administrative expenses:** G&A expenses were split out under the total expense category.

15. **Gross revenue (total operating income):** Gross revenues were the amount that was reported under "total operating income".
16. **kWh from diesel (from Statistical Reports):** The amount of kWhs produced with diesel.
17. **kWh Generated, kWh Sold, Gallons Consumed per year (from Statistical Reports):** The amount of kWhs sold and generated, and the number of gallons consumed per year, per utility.
18. **Line Loss (from Statistical Reports):** The line loss is reported through the Statistical Reports. The line loss is the amount of power that is lost through transmission. The rates were reported exactly as they were from the Statistical Reports (i.e. they were not adjusted down to fit within the 12% allowable cap for PCE purposes). Also, the co-operative line loss rates (for some multi-community utilities) are an average of the line loss for all the communities in the co-op.
19. **Long-term liabilities, Debt amount:** Long-term liabilities can be found on the balance sheets.
20. **Number of employees:** When a utility reported the number of employees, it was done in different ways. In the Annual Report, it can be found in either "Electric Utility Payroll Allocation" or under "Transactions by Account." For FERC style forms, they provide an organization chart as well as a "Summary of Officer's/Owner's Compensation" and "General Information Update Form." Each lists all employees within the organization.
21. **Number of employees (from survey):** The number of full and part-time employees as reported by utility managers on the survey.
22. **Operating expenses:** This can be found on the income statement and was the sum of: fuel expense, purchased power, generator oil, generator filters, generator repairs/maintenance (parts and freight), tools, equipment rental and other (see schedule A). On the FERC style form, it was found on the operation & maintenance form.
23. **Other customers, non-PCE, (from Statistical Reports):** The number of residential and/or commercial customers being served by the utility, but not eligible for PCE subsidies.
24. **Other revenue:** Other revenue can be found on the income statement, and is the sum of: grants, pole rentals, waste heat in-kind, and other (schedule A).
25. **Other subsidies:** Other subsidies can be found under grants on the Annual Report.
26. **Payroll expenses (labor costs):** Payroll expenses can be found on the income statement, under personnel expenses.
27. **PCE amount:** Finding the PCE amount was not always clear-cut. Some utilities reported PCE within their RCA income statements under utility operating income, or reported it separately within the Schedule A form.
28. **Population (from Statistical Reports):** This is the overall population served by the utility.
29. **Repair and Replacement Fund:** Documentation of R&R funds was usually found on balance sheets forms in the Annual Report.
30. **Residential Customers (from Statistical Reports):** This is the number of residential customers currently being served by the utility.
31. **Residential Rate (from Statistical Reports):** This is the rate all residents would pay if there were no PCE subsidies. It is also the rate charged after a household surpasses the 500 kWh threshold, or for those not eligible for PCE.

32. **Sales revenue:** On the Annual Report this was the sum of residential, commercial, community facilities and federal/state facilities sales. For FERC style forms, sale revenue was found on the sales of electricity by rate schedules form.
33. **Source of debt:** Source of debt was one of the difficult categories to find because most of the utilities did not list their sources on their Annual Report. Usually, the itemized list was found within the additional financial documents attached to the Annual Report.
34. **Total assets:** Total assets can be found on the balance sheet in the Annual Report. For FERC style forms, it can be found under total assets and other debits, on the balance sheet.
35. **Total expenditures:** Total expenditures is the total expenses reported on the income statement.
36. **Total liabilities:** Total liabilities can be found on the balance sheet.
37. **Total liabilities and equity:** Total liabilities and equity were found on the balance sheet as the sum of: total liabilities and total equity.
38. **Total utility plant:** In the Annual Report, total utility plant was listed in the balance sheet as the difference between met plant in service and construction work in progress-electric.