City of Fountain Electric Department Strategic Plan

Carl Christian, Electric Superintendent

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Letter from the Superintendent

I am proud to present the proposed City of Fountain Electric Department Strategic Plan. This plan provides the framework for making informed decisions about the future and answers the fundamental question: How can the City of Fountain Electric Department meet our customer's needs in delivering safe, affordable and reliable power in years to come?

The City of Fountain electric utility serves 16,050 residential metered accounts and 978 commercial accounts, representing a population of approximately 46,000 in the Fountain Valley area. Electricity is a unique and essential commodity to our residents, businesses, and government. Maintaining the integrity of our system is paramount to economic vitality and public safety.

As a municipal utility dedicated to our customers and surrounding communities, our mission and values are reflected in this results-focused plan. The plan is designed to provide tangible benefits, enhanced reliability, innovative customer service, and improved infrastructure that is essential to a high-performance workforce, improved accountability and cultivating economic development on our system over a predictable period of time.

Through extensive analysis and reviews of the existing infrastructure, future growth and needs within our service area, as well as reviewing our electric utility practices in comparison to industry best practices; I can say with confidence that this is the most comprehensive strategic plan that has been developed in the history of the City of Fountain Electric Department. We appreciate the many contributions that we have received to make this plan as dynamic and informative as possible.

As our electric service territory continues to expand, this is a critical and fundamental time for the City of Fountain to make crucial decisions and investments to ensure our legacy of safe, reliable service, as well as rate predictability for our customers.

We are very proud of the system we maintain and the service we provide to our customer owners.

Sincerely,

Carl Christian
Superintendent
City of Fountain
Electric Department

Summary

This Strategic Plan provides the best course of action required to meet our current and future needs in the most advantageous and efficient ways possible. As we meet the measurable and attainable goals set forth in this plan, it will be updated biennially by the City of Fountain Electric Department to reflect new realities and needs. Specific elements will need to be adjusted and adapted, but the frame work will remain consistent.

As these amendments are completed, they will be submitted for adoption by the City Council every two years. The Electric Department will revisit the plan on a biennial basis in conjunction with the city's budget schedule and necessary amendments to the plan will be presented to City Council for review. Beginning in 2017, the Electric Department will develop the subsequent biennial budget based on the approved plan.

Present circumstances

To serve anticipated growth, the City of Fountain Electric Department will need to add a significant number of new substation and transmission facilities over the next ten years.

The purpose of this plan is, in part, to provide foundational guidance for approximately 25 million dollars in electric system additions and upgrades. The plan also provides a timeline relative to specific load additions while maintaining Fountain's record of excellence in providing safe, reliable, cost effective electric service. In addition, it is to assist in preserving our legacy of accountability and transparency for the utility as a whole and for individual employees.

By identifying specific projects, funding required and the corresponding initiatives to accomplish the necessary electric system improvements, we can efficiently complete each phase while clearly justifying the need for each project and how it will affect our community.

The City of Fountain electric system is an incredibly reliable and valuable asset, however, as we continue to expand within our electric service territory and the community's needs continue to rise, so do the challenges we face to meet the growing demand for this unique commodity.

Specific challenges include:

- Growing Territory – additional energy, substations, transmission and distribution are required
- Retaining a highly skilled and experienced workforce
- Capital funding

As the urgency to address the above challenges rise, so does our responsibility to mitigate any delays that would cause a failure in our ability to meet our customers' needs and expectations. If system enhancements are not met in a timely manner, these delays may result in higher cost, lower reliability, lost economic development opportunities and a decrease in customer satisfaction.

CONTENTS

Letter from the Superintendent 2

Summary 3

Table of Contents 4

1 City of Fountain 5-6

2 Fountain Electric System 7-20

3. Growth Projections 21-23

4. Risks / Challenges / Opportunities 24-32

5. Mission/goals/objectives 33-34

6. System Expansion Requirements 35-40

7. Staff 41-42

8. Regulatory Environment 43-44

9. Regional Influences 45

10. Stakeholders 46-47

11. Capital and O&M 48-52

12. Conclusion 53

Appendix - 54-59

1 City of Fountain

1.1 Overview of the Region

The City of Fountain covers 22.23 square miles; however, the electric utility also serves two Colorado Springs suburbs and additional areas south of Fountain that are in our certificated service territory. Fountain's total electric service area is 65.77 square miles **(Figure 1)**.

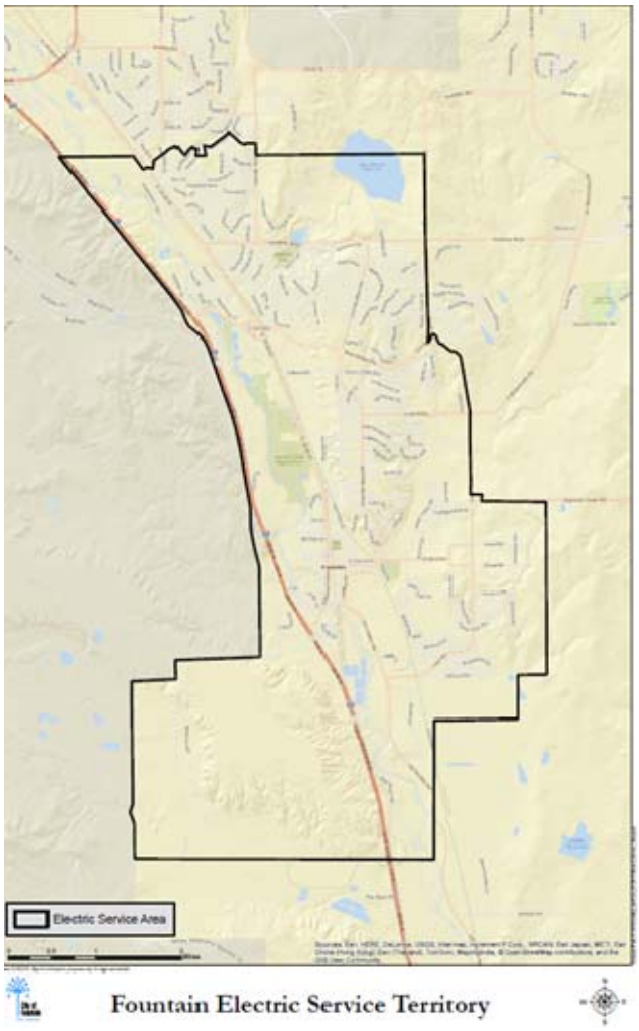


Figure 1: City of Fountain electric service area

1.2 Fountain's governance and leadership

The City of Fountain is a Home Rule Municipality governed by a Mayor and six Council Members located in El Paso County, Colorado. The term of office is four years for the Mayor and Council Members. The Mayor and three members of the Council are elected at-large and three are elected from the wards in which they live. Council elections are non-partisan. All departments are administered by the City Manager. The City Manager is responsible for the general day-to-day oversight and management of the City of Fountain and is responsible for directing the development and implementation of the City's operating budget. All power and authority to set policy and tariffs rests with the elected governing body.

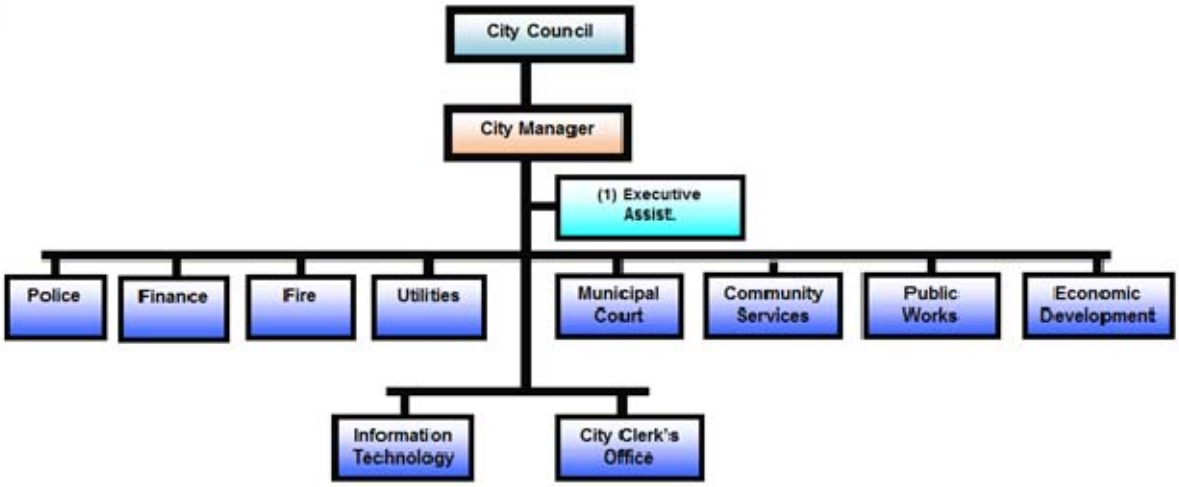


Figure 2: City of Fountain department organization

2 Fountain Electric System

2.1 Overview of Fountain's existing system.

The City's electric grid is comprised of a 115kV transmission system and a 12.47 kV distribution system. The City owns and operates 2.64 miles of 115kV transmission and 58 miles of 12.47 kV three phase main line. The two City-owned and operated substations are comprised of seven 115 kV circuit breakers and five 115 kV to 12.47 kV power transformers. The capacity of the two substations is 78 MVA with 10 active distribution circuits, 2 spares and substation space for 1 future circuit.

2.1.1. Fountain Electric History

Fountain was built in 1859 as a railroad shipping center for local ranches and farms. In 1903, the town was incorporated and named after Fountain Creek, which is the creek Fountain was built along. The town sits in the east central portion of the state of Colorado, approximately 10 miles south of downtown Colorado Springs and adjacent to Fort Carson. Many military families call Fountain home because of its close location to the Fort Carson base.

The first ordinance concerning the Electric Light Plant and Regulating the Control of the Same and Fixing the Rates Charged for Electrical Current was adopted on September 15, 1919 and authenticated on September 17, 1919 by the town Mayor, F.E. Torbit.

2.1.2. Certificated service territory (city limits vs. service territory)

The City of Fountain's Electric Service Territory Certificated Area is a total of 65.77 sq. miles **(Figure 3)**, of which 43.54 sq. miles lie outside of city limits. The certificated service territory serves portions of El Paso County located to the north of Fountain known as Widefield, portions of Security and areas south of Fountain, all outside of city limits.

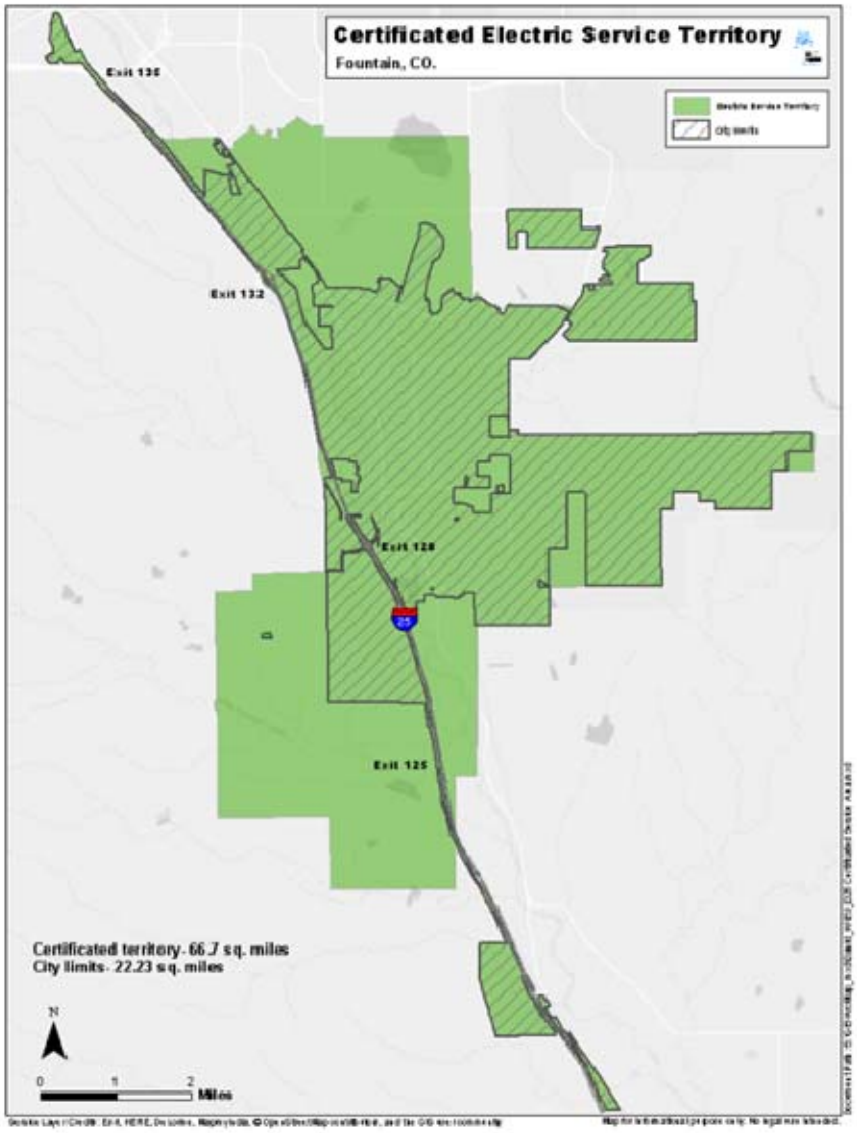


Figure 3: City of Fountain certificated Electric Service Territory

2.1.3. Purchase power contract

The City of Fountain does not generate its electricity; it is purchased wholesale and delivered to our customers through two substations on our system. The City was receiving electricity from the Municipal Energy Agency of Nebraska (MEAN) through two 5 year contracts which ended in June 2015. During 2014, in preparation for the end of contract with MEAN, the City requested and evaluated several wholesale power supplier proposals. After a rigorous evaluation and negotiation process, the City obtained a longer contract term of service, lower wholesale power costs and long term rate stability with Twin Eagle Resource Management. Our customers saved approximately 12% compared to earlier contracts.

2.1.4. Substation / Capacity

Our current substation capacity is 78 MVA with an emergency capacity of 106 MVA served via five (5) 115kV to 12.5kV substation transformers.

North Fountain Substation Transformers

T1: 15/20 MVA installed in 2015

T2: 15/20 MVA installed in 2015

T3: 16/22 MVA installed in 1981

T4: 16/22 MVA installed in 1997

West Fountain Substation Transformer

T5: 16/22 MVA installed in 2001

Substation capacity is important because, along with transmission lines, it represents one of the first steps in delivering energy from our wholesale energy provider to our customers. Fountain has to have enough substation capacity to meet our customers usage and to provide backup if substation equipment fails.

2.1.5. Transmission

The Colorado Springs Utilities (CSU) Substation providing service to Fountain has two incoming 115kV transmission lines, one from their Nixon substation and one from their Bradley substation. There is one 16/22 MVA transformer located at the West Fountain Substation (within CSU's Fountain Substation) to step down the voltage and feed 3 of the City's distribution circuits. There are also two outgoing 115 kV lines owned by Fountain, from the Fountain Substation, that feed the City of Fountain Rustique Substation where the voltage is stepped down via two 15/20 MVA and two 16/22 MVA transformers. These four transformers serve the remaining distribution circuits.

2.1.6. Distribution (Overhead, Underground)

Distribution lines from two substations on Fountain's system serve our customers. Fountain currently has 150 overhead line miles and 382 underground line miles.

Note that under Chapter 17.39 Section 17.391 A of the city code, all new residential and nonresidential electric distribution lines shall be placed underground, unless the Utilities Director approves overhead installation.

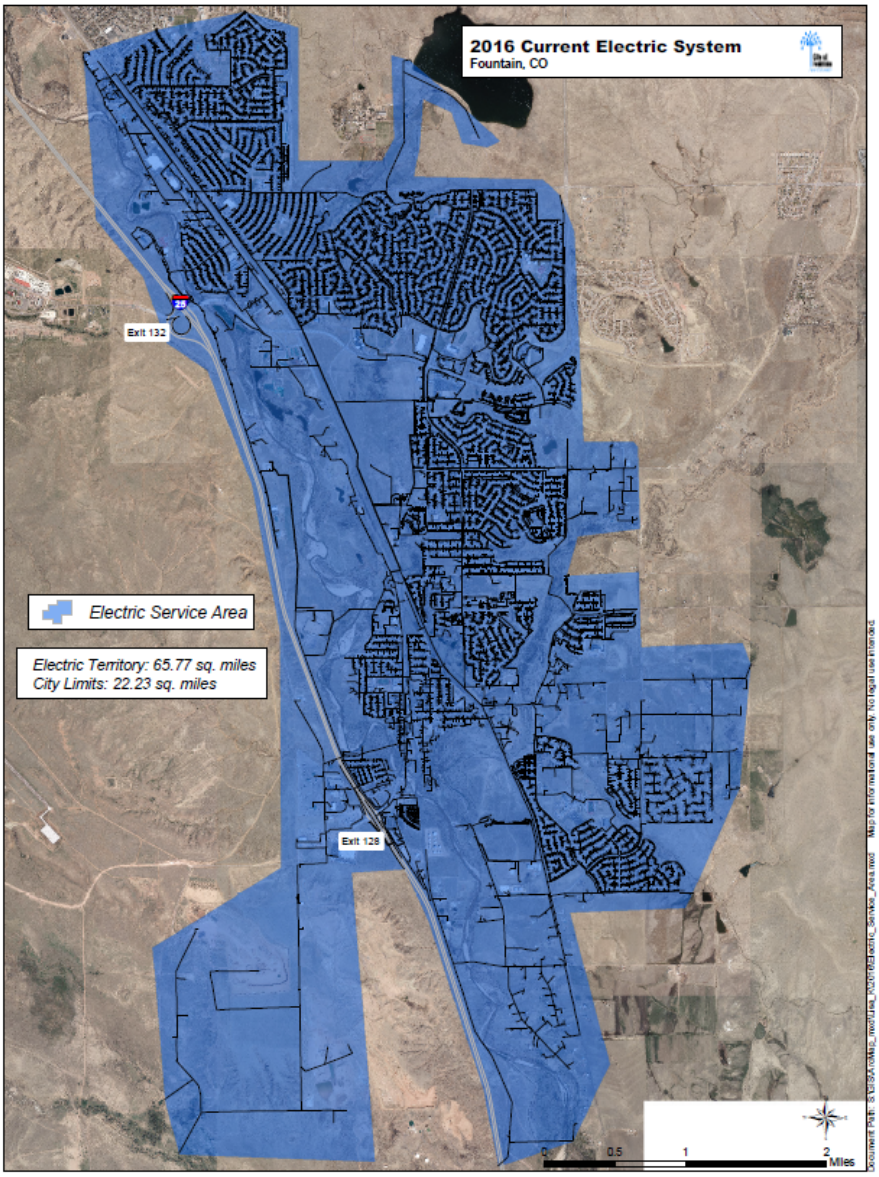


Figure 4: City of Fountain Current Electric System

2.2. Customer base (Residential, Commercial, Industrial)

The majority of the customer base is residential. Currently there are a total of 17,028 active accounts, which includes approximately 978 commercial accounts. Residential and commercial accounts are anticipated to continue to grow and there is one industrial site, with a dedicated line, that is currently vacant. Because Fountain electric has a mandate to serve customers within its certificated service territory, planning for future growth is essential. This growth can occur in any rate class and must be considered as part of our future capacity needs.

2.3. Historical Data 2006 – 2015:

2.3.1. System Demand

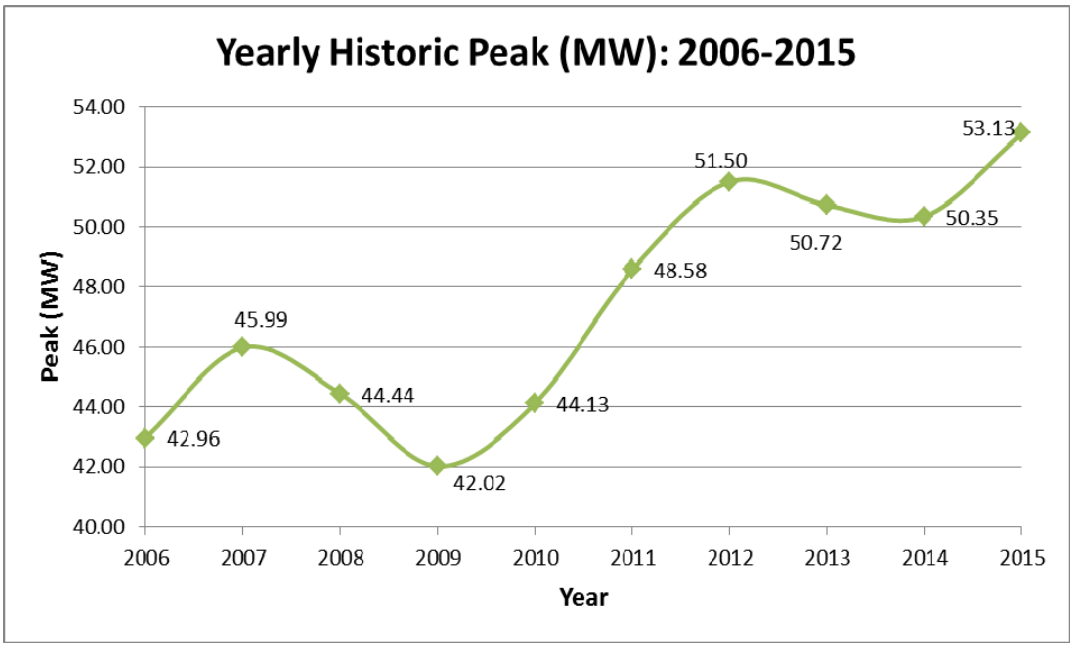


Figure 5: Yearly Historic Peak (MW): 2006-2015

System demand refers to how much power is transferred during our peak. Peak load can be associated with a number of factors including (but not limited to): population growth, seasons and weather, and time of day.

As shown above in **Figure 5**, the peak load on the system from 2006 to 2015 occurred August 2015 with a peak of 53.13 MW. This figure shows a peak load growth of 10.17 MW in ten years and the general trend over the last ten years is upward, or growing. The data used to create this figure can be found in **Appendix A-Data Table 1**.

2.3.2. Energy Usage

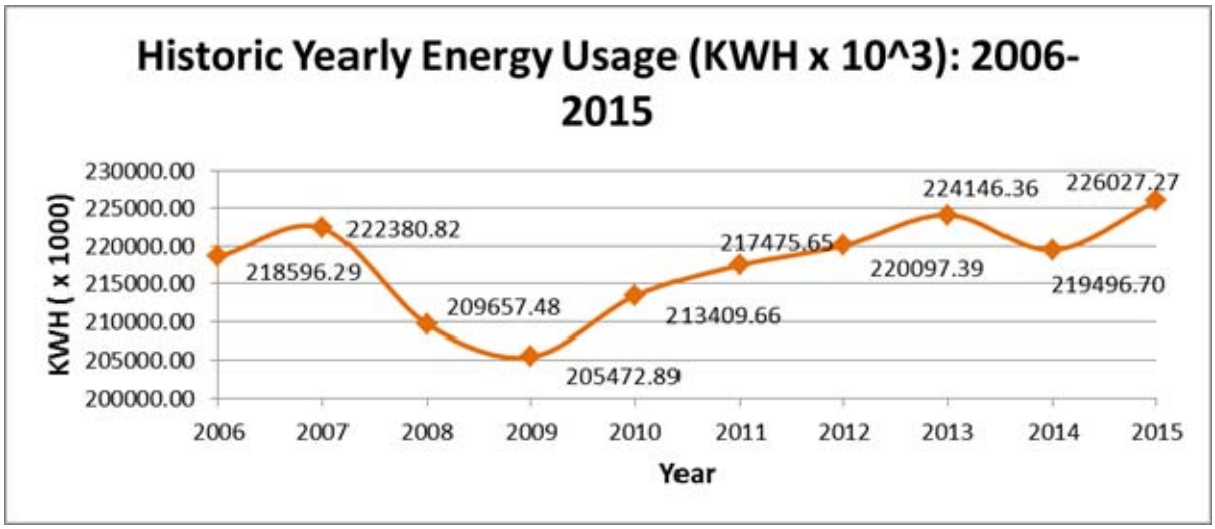


Figure 6: Historic Yearly Energy Usage: 2006-2015

Energy usage refers to how much energy is consumed by our customers. Energy is measured in kilowatt-hours (KWH) and is what a residential customer is charged for. It is energy that is driving the customer's electrical devices. The Electric Department has to consider several factors when looking at system and customer energy usage to include (but not limited to): transformer capacity, phase balance, conductor ampacity, and system loss.

As shown above in **Figure 6**, the general trend for energy consumption is upward, indicating load growth. The exception to this trend would be between years 2007 and 2009 when the City of Fountain lost a major manufacturing facility, Sanmina-SCI. Even with this loss, the City was able to recover in recent years due to a growing number of both residential and commercial services. The maximum energy usage occurred in 2015 at 226,027,270 KWH, and the energy usage growth over the last ten years is shown as 7,430,980 KWH. The data for this plot can be found in **Appendix A-Data Table 2**.

2.3.3 Load Factor

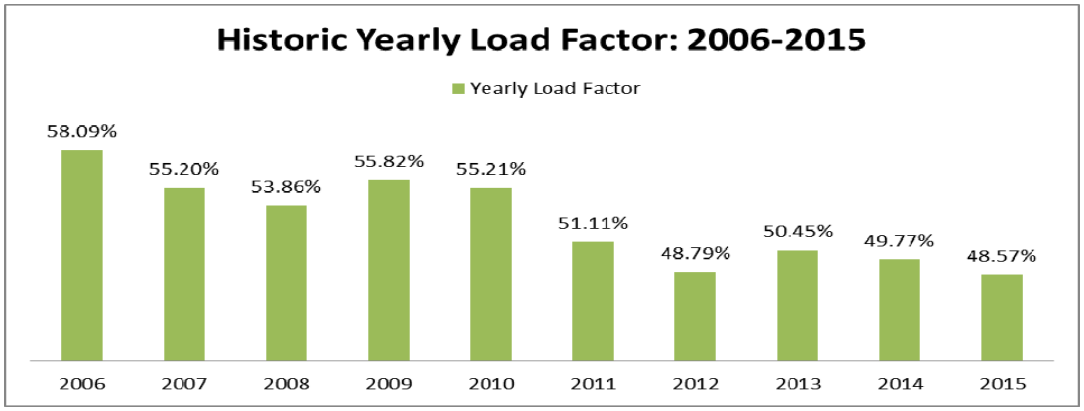


Figure 7: Historic Yearly Load Factor: 2006-2015

Load factor is the ratio of the average load to the peak load and it is usually expressed as a percentage. In an ideal case, the load factor would be 100% meaning that the average load and the peak load are the same and the system is being utilized to its full potential. This is usually not the case, as the peak load is typically greater than the average load. The Electric Department is responsible for having infrastructure to support the peak load.

An example of effects on load factor can be seen from an observation of Fountain's Historic Monthly Load Factor located in **Appendix A-Data Table 5**. Looking at the monthly load factor for the years 2011-2015, it can be seen that the load factor is lowest during the summer months of June, July, and August. Now, assume that the peak load goes up during these months because more and more customers are installing air conditioners and only using them during the hottest parts of the day. With customers using their AC all at the same time of day, this will drive the peak load up because there is a greater demand for energy during the hottest part of the day.

Now, realize that the average load will not be as great as the peak load because the AC units are only on for part of the day; the rest of the time the energy usage is well below what the peak load is.

The Load Factor in this case is lower since the average load is much lower than the peak load.

With a better understanding of load factor, **Figure 7** can be interpreted more clearly. As shown above, Fountain's Yearly Load Factor is on a declining trend. Within a 10 year time span, the load factor dropped 9.5%. There are various causes of this decline but the main point is the system must be built to support a larger peak load, while the average load is well below it and so the system is not used to its full potential resulting in a lower return on distribution system investment.

Declining load factor is an issue many utilities face across the nation. Some possible solutions that are being used by other utilities include voluntary Time Of Use (TOU) rates where customers are encouraged to reduce consumption during a specific time of day as well as economic development activities to attract new high Load Factor customers such as data centers.

With Fountain's current Power Purchase Agreement, the City is not charged for the demand component of usage but once the current contract ends, this will be an issue that needs to be addressed.

2.3.3. Growth Rate

In 2014, Harvey Economics conducted a population growth study for the City of Fountain. The study led to population projections for years 2014-2025 which showed an annual population growth rate of 2.46%. El Paso County growth rate was projected at 1.5% per year.

2.3.4. System Reliability

Various indicators are used throughout the utility industry to measure system performance. These indicators are particularly useful in monitoring the quality of our service to customers and prioritizing maintenance and upgrade capital expenditures.

As a community owned utility, the City of Fountain strives to provide the most reliable power to our customers through the use of proven upgrade technologies and quality maintenance programs. The Electric Department conducts reviews of all outages and equipment failures to improve our response and address any ongoing issues. This also helps to plan the use of funding for replacement of aging infrastructure and reinforcing our system with needed upgrades to support system reliability. Our Average System Availability Index (ASAI) has been 99.998% over the past 5 years. The outage information for the Median Value for North American Utilities utilized in the charts below was obtained from the Institute of Electrical and Electronics Engineers (IEEE).

Below in **Figures 8 through 10** are the 5 year historic reliability records.

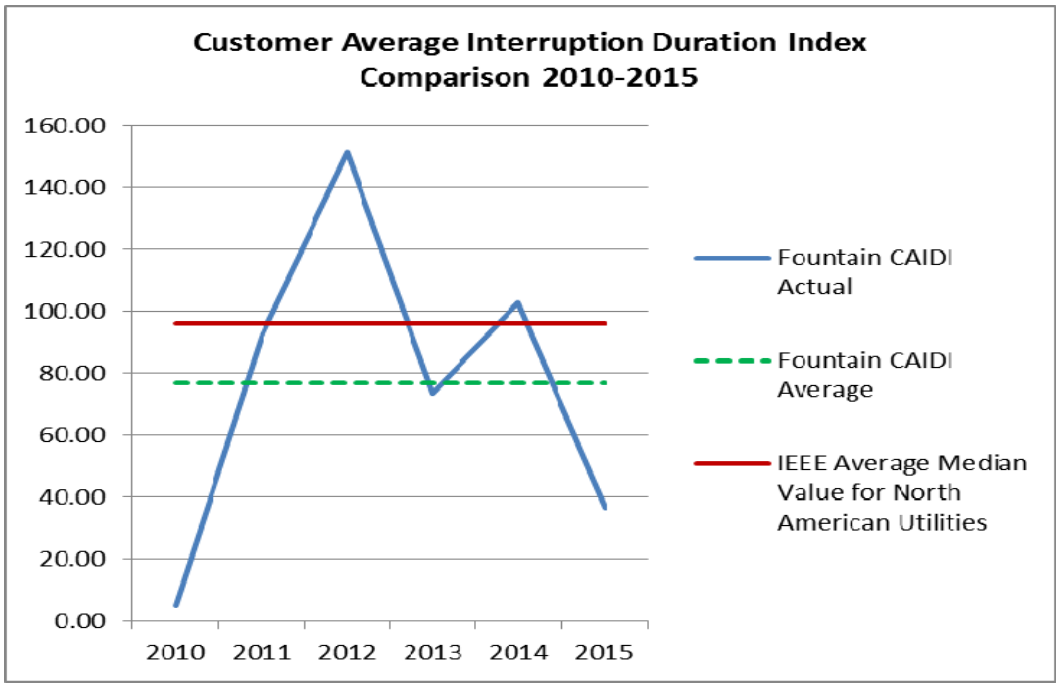


Figure 8: Customer Average Interruption Duration Index (CAIDI) data 2010-2015

Customer Average Interruption Duration Index (CAIDI) is a reliability index electric power utilities use to calculate the average outage duration that any given customer experiencing an outage would expect. CAIDI is measured in units of time, usually minutes or hours. The median value for North American utilities is approximately 96 minutes according to IEEE Standard 1366-1998.

The graph shown above in **Figure 8** shows this outage duration in minutes calculated for each year from 2010-2015. Note that there were increased outages experienced in 2011 & 2012. These outages were caused by weather events, underground faults, and equipment failures. The notable decrease in outages after these years was due to system upgrades and programs that addressed the challenges of the aging infrastructure.

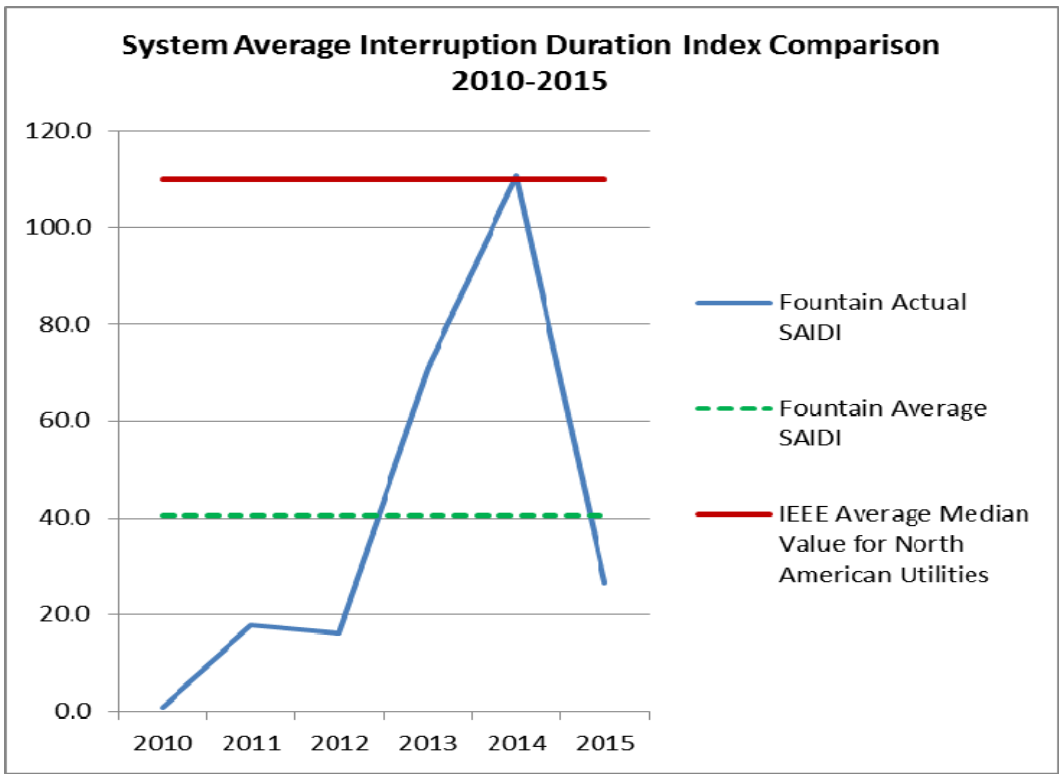


Figure 9: System Average Interruption Duration Index (SAIDI) data 2005-2015.

The System Average Interruption Duration Index (SAIDI) is used as a reliability indicator by electric power utilities. SAIDI is a calculation of the average outage duration for each customer served, and is measured in units of time. The median value for North American utilities is approximately 110 minutes according to IEEE Standard 1366-1998.

Above in **Figure 9**, SAIDI is shown in minutes, calculated per year from 2010-2015. The longest outage for the City of Fountain Electric Department was 110 minutes, which is right at the median value according to the IEEE Standard listed above. Note that there was a catastrophic weather event that caused a major outage experienced in 2013.

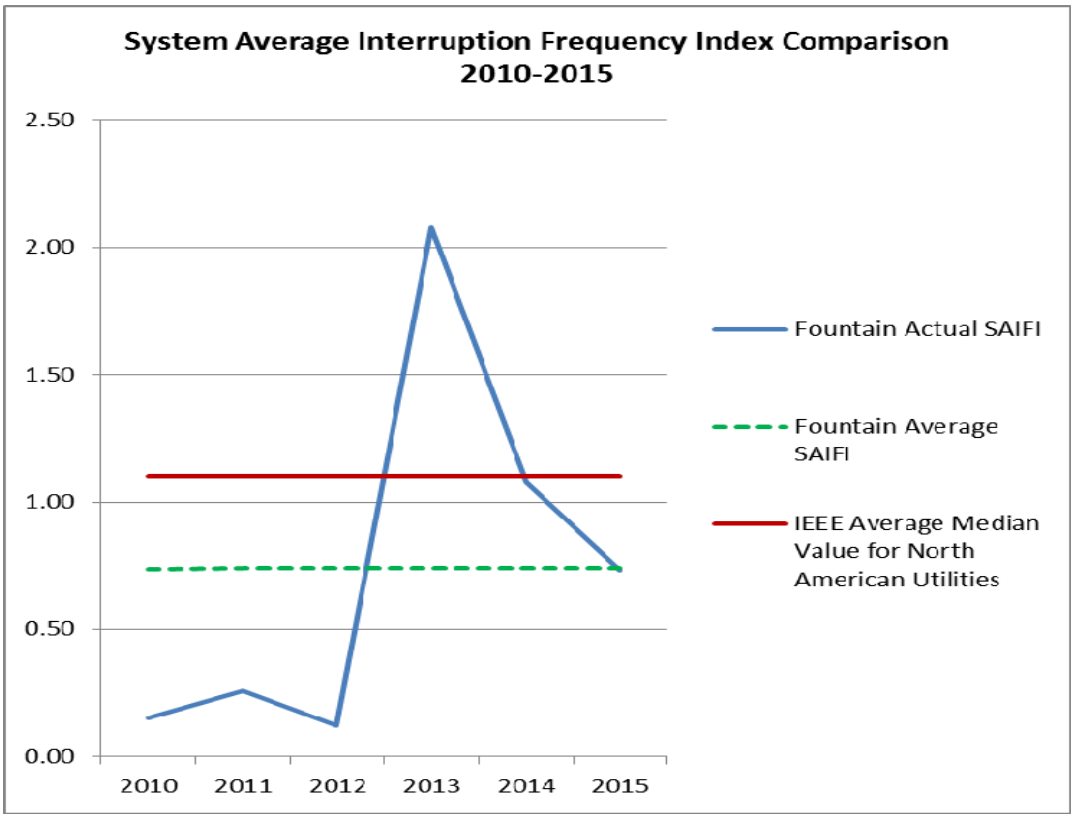


Figure 10: System Average Interruption Frequency Index (SAIFI) data 2010-2015.

The System Average Interruption Frequency Index (SAIFI) is another reliability indicator used by electric power utilities. SAIFI is a calculation of the average number of interruptions that a customer could experience, and is measured in units of interruptions per customer. The median value for North American utilities is approximately 1.10 interruptions per customer per year according to IEEE Standard 1366-1998.

As seen above in **Figure 10**, the City of Fountain interruptions per customer for the years 2010-2015 are mostly below the median value. The exception would be in 2013 when we experienced a major outage that affected 3,500 customers for 97 minutes due to flood waters in Fountain Creek damaging a distribution line coming out of our West Fountain Substation.

The consistent reliability of the electric system is largely contributed to timely and successful preventative maintenance programs, effective training methods for our employees and their dedication to responding quickly and efficiently to outage reports 24 hours a day, 7 days a week. In addition to our employees taking great pride in maintaining the reliability of our system, the installation of upgrades to the existing infrastructure with the latest technology continues to improve reliability performance.

2.3.5. Historic Customer Account Statistics

Over the past 10 years customer accounts have grown considerably with a slight drop in customer accounts during 2009 & 2011. The 10 Year Historic Customer Account trend can be seen below in **Figure 11**.

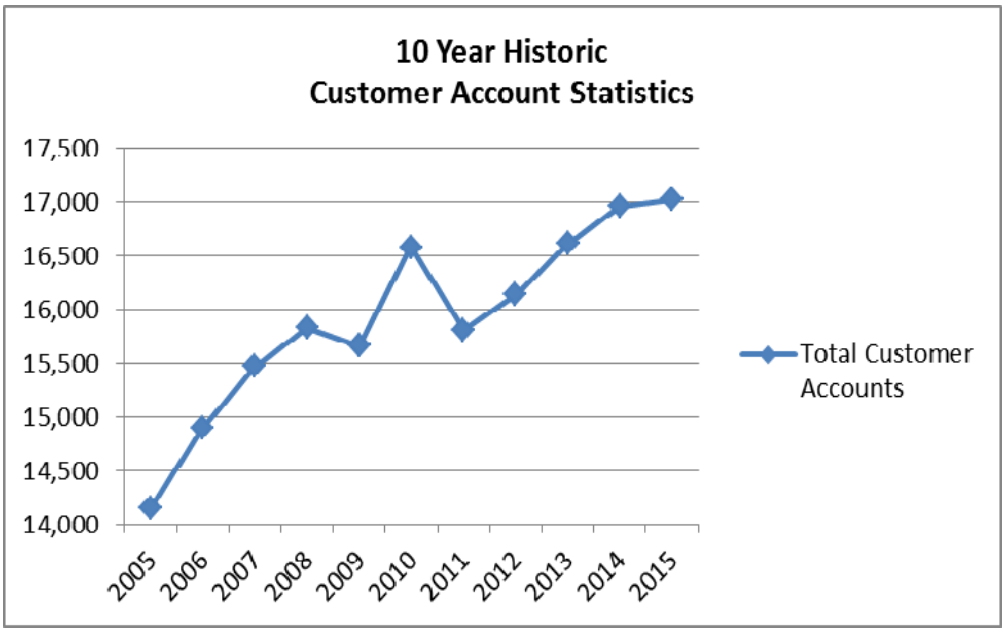


Figure 11: 10 Year Historic Customer Account Statistics

2.3.6. "Franchise Tax" payments to City Fund.

Over the past five years the "Franchise Tax" payments from the Electric Department to the City Fund has increased by approximately 20%; this increase can be seen below in **Figure 12**.

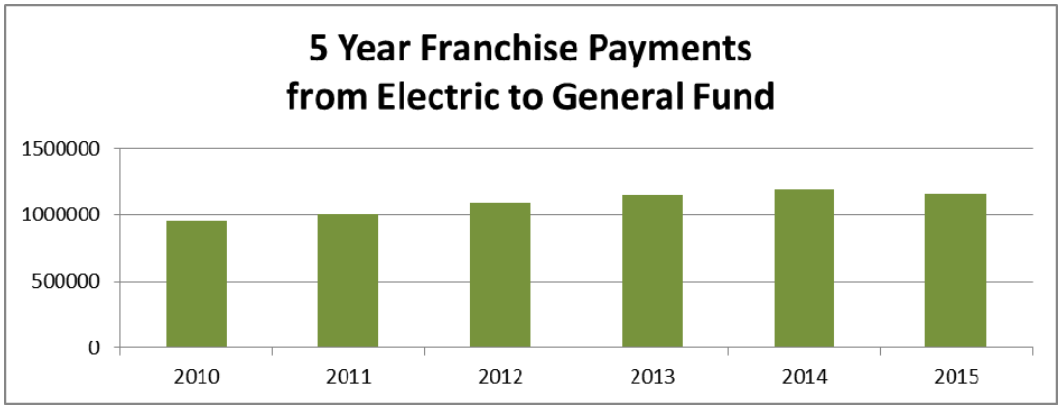


Figure 12: Franchise Payments data 2010-2015

2.3.7. Four Year History of Operations & Maintenance and Capital Spending

Historically, operations & maintenance and capital spending has been based on the evaluation of infrastructure needs in the overall context of available funding sources, what the utility can afford and how the city can grow in the most sustainable way possible. The preservation of the utilities long-term fiscal stability is paramount to keep rates low for our customers while retaining reliability throughout the electric

service territory. Below, is the summarized 4 year history in total for operations & maintenance and capital spending.

Four Year History of Operations & Maintenance and Capital Spending

	2012	2013	2014	2015
Power Purchase	$ 13,431,911.46	$ 14,342,259.10	$ 15,356,574.49	$ 13,764,039.62
Capital Spending	$ 9,095,666.54	$ 10,126,925.90	$ 12,731,282.51	$ 15,176,670.38
Operations & Maintenance	$ 21,663,686.00	$ 23,219,513.00	$ 25,188,193.00	$ 23,924,790.00
Total Electric Fund	$ 44,191,264.00	$ 47,688,698.00	$ 53,276,050.00	$ 52,865,200.00

2.3.8. Rate Comparison

The City of Fountain strives to provide quality service and reliability at the lowest rates available for our customers. In a recent rate survey completed in January 2016, the City of Fountain ranks below the overall average comparison to municipal utilities for residential, small commercial and large commercial accounts. Comparison charts for residential, small commercial, and large commercial accounts can be found below in **Figures 13 through 15**. At this time, there are no industrial accounts within the City of Fountain Electric Service Territory. Note, this information obtained from CAMU Rate Study completed in January 2016.

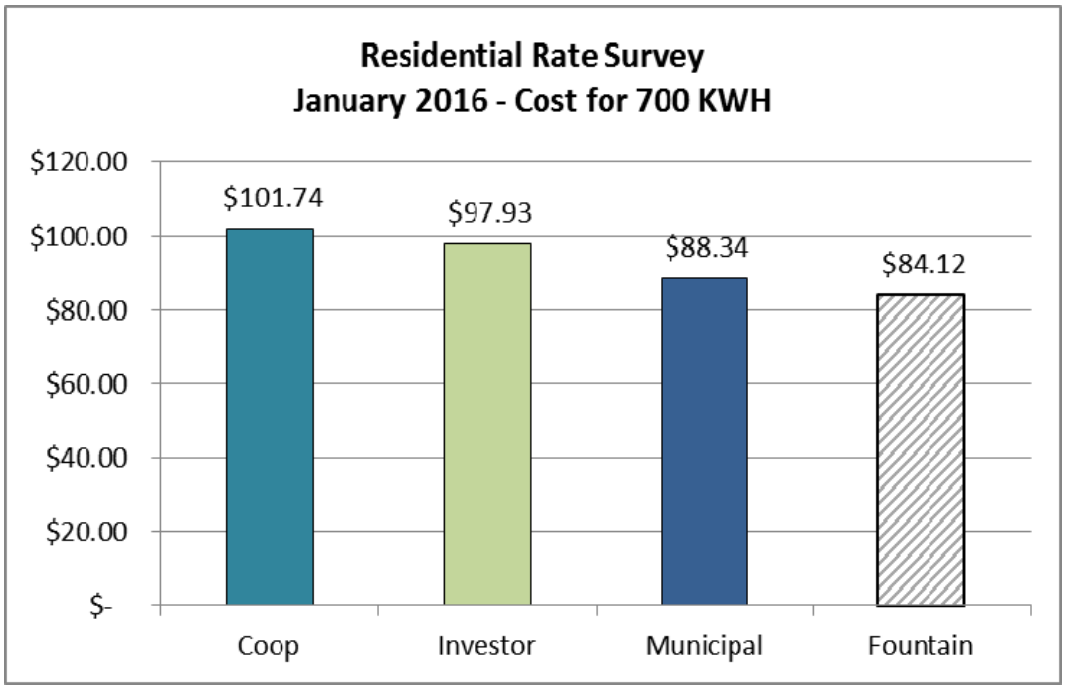


Figure 13: Residential Rates Comparison January 2016.

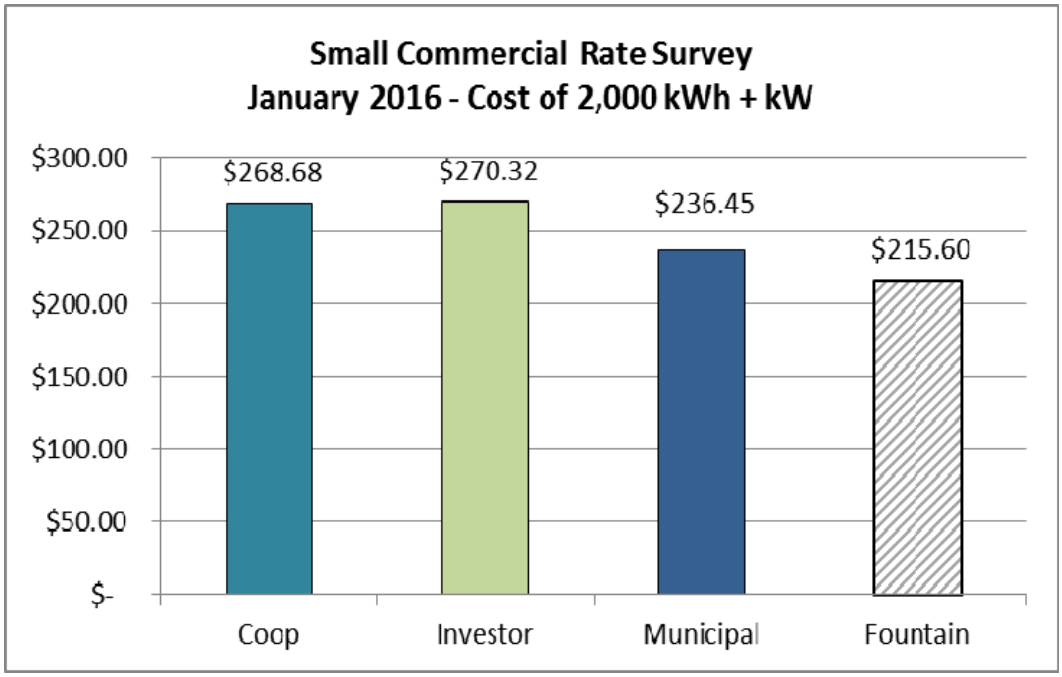


Figure 14: Small Commercial Rates Comparison January 2016

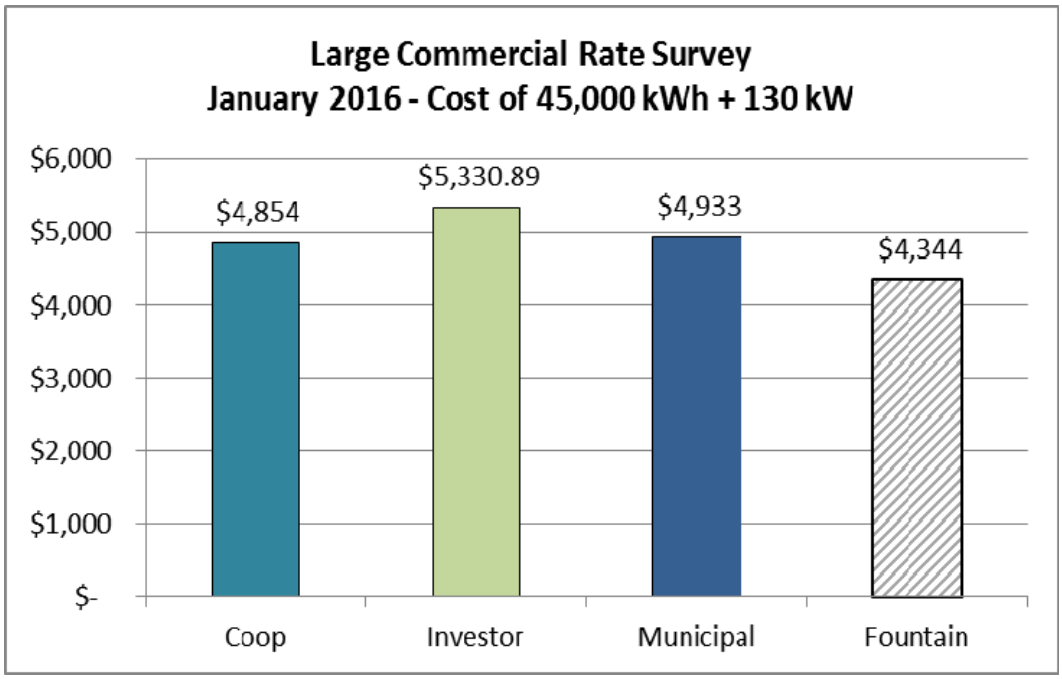


Figure 15: Large Commercial Rates Comparison January 2016

2.4 Interaction with City Departments

The Electric Department has an exceptional track-record of reliable service and timely responses when issues arise on our system. While this is largely attributed to our well trained crews that are committed to serving our customers in a safe and efficient manner in every aspect of their job, it is also attributed to the support that we receive from other departments within the city.

To be fiscally responsible to our community, it is most advantageous to share the city's resources to reduce expenditures and fulfill performance requirements. This is mutually beneficial for the Electric Department and other departments of the City.

3. Growth Projections

3.1. State, County and local growth projections

The information below was obtained from the State Demography office at https://dola.colorado.gov. Population projections are based on most recent estimates and forecasts of county specific births, deaths, and net migration.

The Population Projection for the State of Colorado from 2014 to 2025 is shown below in **Figure 16**. Note, the average growth rate predicted for the state is 1.7% annually.

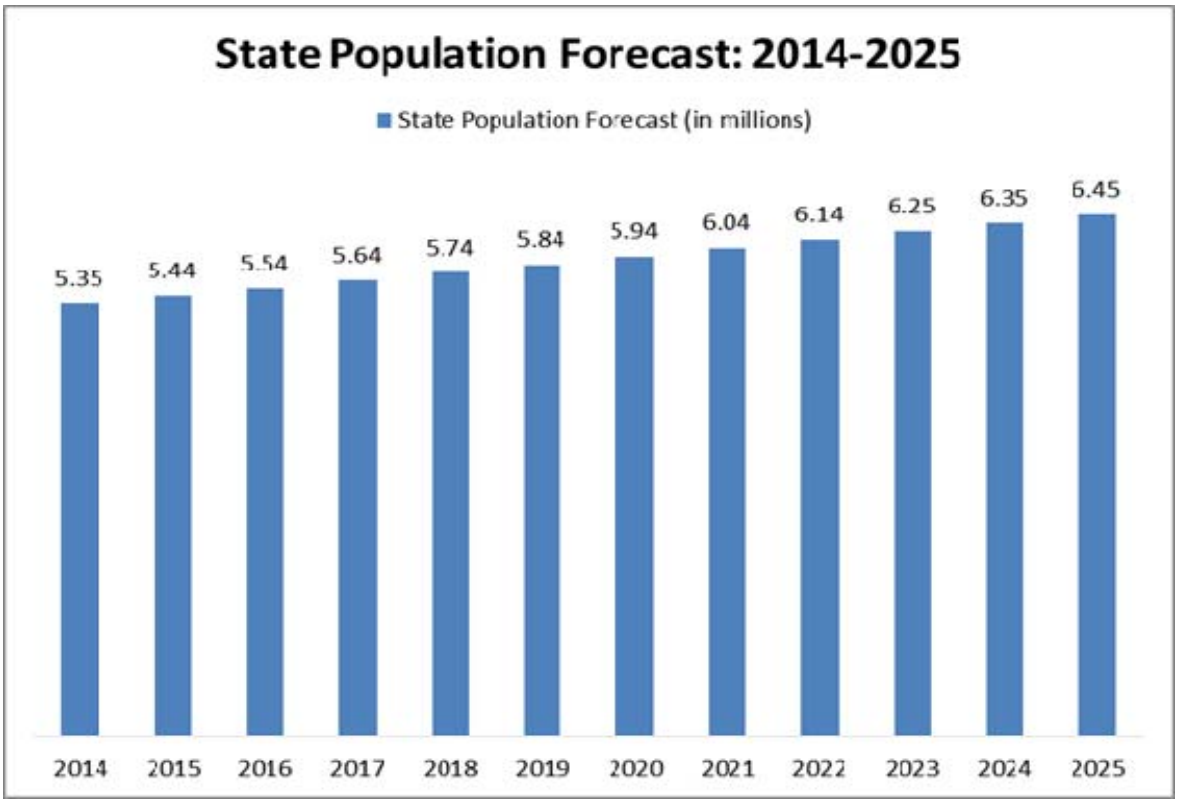


Figure 16: Population Forecast for the State of Colorado 2014 to 2025

The population Forecast for El Paso County Colorado from 2014 to 2025 is shown below in **Figure 16**. Note, the average growth rate predicted for El Paso County is 1.5% annually.

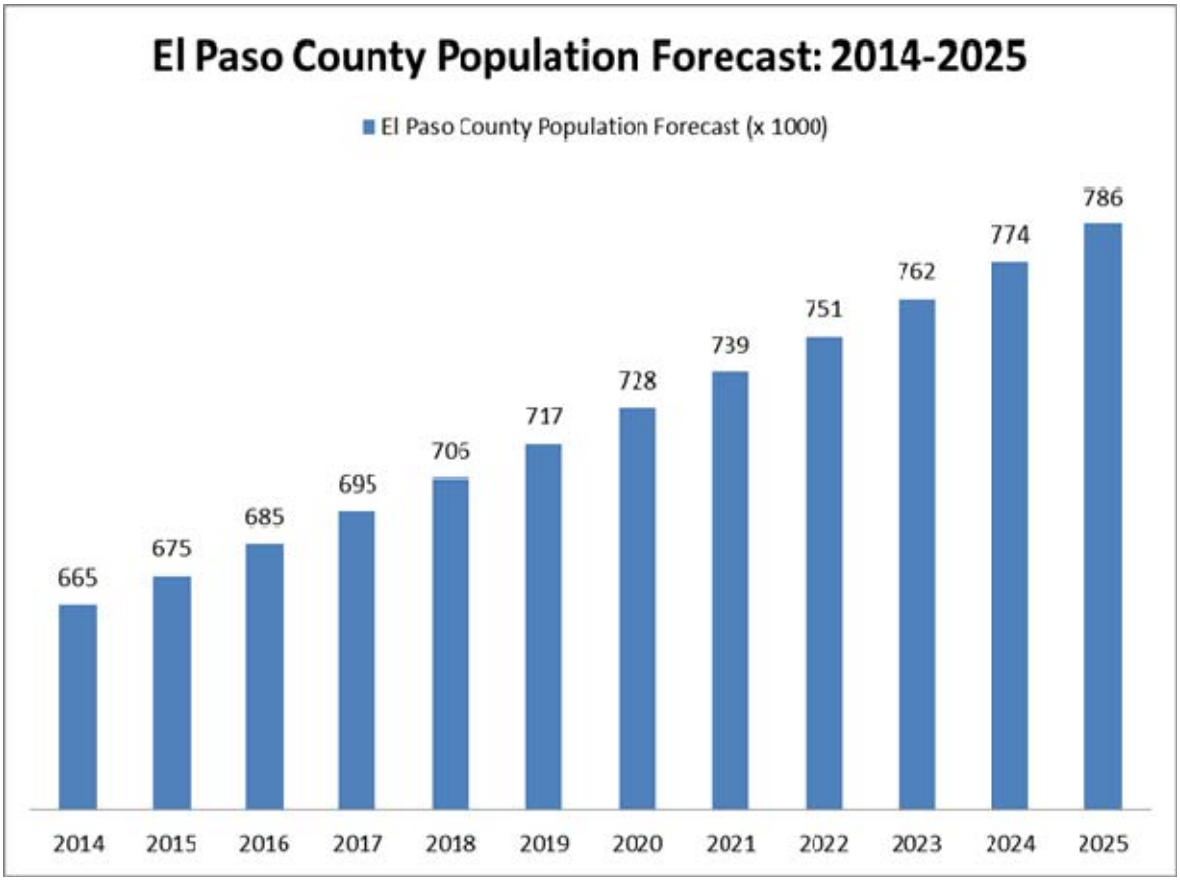


Figure 17: Population Forecast for El Paso County Colorado from 2010 to 2025

The Population Projection for the City of Fountain from 2014-2025 is shown below in: **Figure 18**. Note, the average growth rate predicted for the city of Fountain is 2.46% annually.

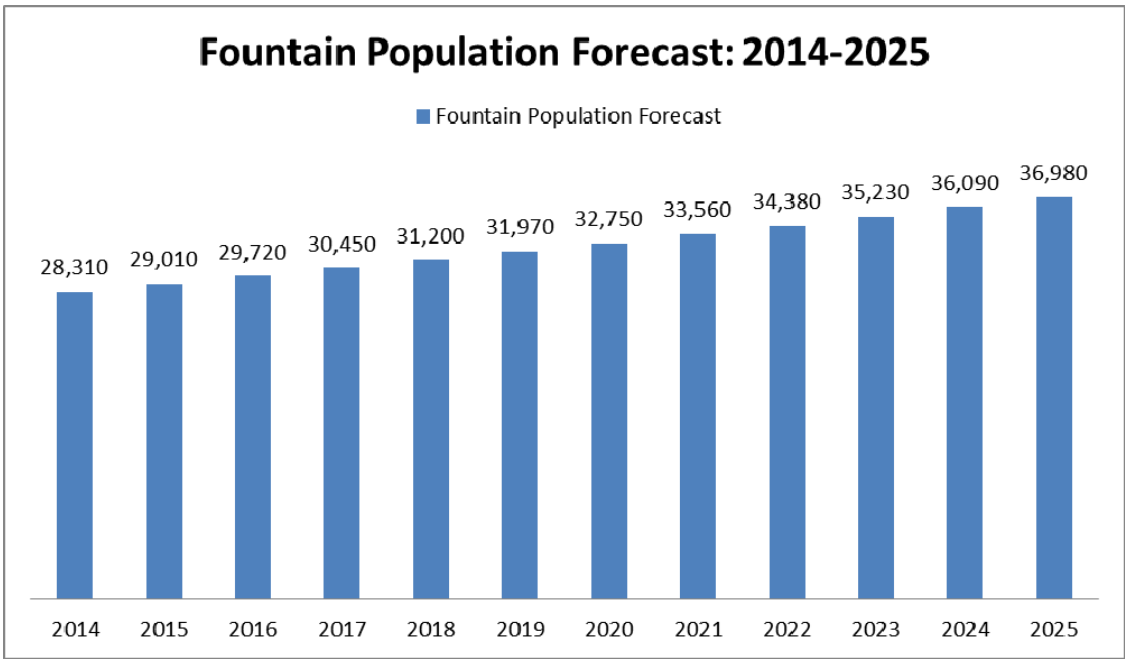


Figure 18: Population Forecast for the City of Fountain from 2014 to 2025

Fountain has grown so rapidly over the past decade the 2010 Census and demographic projection models were not able to keep up. Indeed, the city's growth rate has been nothing short of remarkable, reaching a high of 15% annually in the early 2000s and leveling off to 8% after the recession, significantly greater than the model's forecasted growth rate.

3.2 Expected regions of industrial, commercial and residential growth in Fountain

Current forecasts are predicting a return to 12-15% growth rate with Fountain on an accelerated growth path when; compared to the rest of the state. The city had an estimated population of 28,996 in January of 2016 and estimated 17,000 in the surrounding areas served by the electric utility. With growth come opportunities, challenges and risks which need to be identified and addressed through effective planning.

4. Risks / Challenges / Opportunities

Utility line work is in the top 10 of the most dangerous jobs in America. Approximately 30 to 50 workers in every 100,000 are killed on the job every year. Many others suffer non-fatal injuries from electrical burns and mechanical trauma. Needless to say, this line of work is not a highly sought after career choice and the rapidly evolving workforce of Electric Journeyman Linemen is re-shaping the risk profiles of not only our local utility, but utility organizations across America. This poses unique challenges in obtaining, retaining and maintaining a safe, well trained and experienced workforce.

These challenges are a primary concern for the City of Fountain. Over the past five years, we have lost 12 skilled journey line workers; of those 12, 4 were retirements. The non-retirement departures were employees seeking higher pay with better retirement benefits. Currently, our electric line crew wages are lower than neighboring organizations for their positions. The reality of this wage deficiency is that it is hard to retain employees, as well as, attract new talent to replace key workers that voluntarily separate and/or retire.

In addition, with experienced workers looking towards retirement, retirement plans offered by the City are constantly analyzed and compared to surrounding utilities in our region by our employees. If the retirement plan offered by the other utility is considered to be more advantageous to our employee it could be enough motivation to change employers.

Historically, labor rates are higher in this industry due to the dangers employees face in the field and the years of training required to achieve proficiency in this field. As such, competitive wages are also a key factor to retaining experienced employees, in addition to attracting new talent. Another challenge has been a lack of return on our investment of our apprenticeship program and extensive post program training. We are being utilized as a training opportunity to newer employees in this field of work to gain experience to branch out to other higher paying electric utilities.

While our customers benefit from low electric rates and excellent reliability with outage times below the national average; the City is demanding superior work from our employees for less pay. The quality of service and reliability our customers have become accustomed to will suffer if we are unable to hire and retain experienced employees that are familiar with our system.

As we analyze these risks and challenges, we have the opportunity to continue ensuring the safety of our crews through the continual enhancement of our safety program to meet or exceed industry standards and reduce further voluntary departure rates by addressing the external inequities in wages by creating a pay strategy to compete directly with relevant external labor markets. Meeting these markets will be based on affordability, fiscal responsibility and considerations for maintaining internal equity. We also have the opportunity to explore the retention of apprentices trained through Fountain by implementing an apprenticeship agreement which states the apprentice will remain employed with the City for a certain number of years after the apprenticeship is completed. If this agreement is not fulfilled, the apprentice would then need to pay back the cost of books and training expenses, which is approximately $7,000.00. Over a 4 year period it costs the City approximately $290,000 to pay and train an apprentice.

4.1. Labor Availability / Cost – Healthcare / pensions

4.1.1 Labor Availability

Currently, there are a total of 31 employees that provide support for the Electric Department in a variety of roles. Of these 31 employees, 21 comprise our field crews. Challenges attracting, training and retaining talent are a significant issue for the Electric Department as we constantly compete with other publicly owned and investor owned utilities for skilled workers. Over the past several years, prevailing shortages in journeymen linemen in the electric industry have been experienced and are expected to continue; making electric field personnel a valuable commodity to our utility. As we respond to this challenge, the City of Fountain continually makes investments in workforce development to address the competitive compensation issues and pending retirement of dedicated employees, to reduce injuries and to improve customer service.

Fountain has historically used contract labor where cost effective or in an effort to augment our existing workforce when workload is high. Contract labor cost is significantly higher than in house labor so using contractors to perform base load work is expensive.

4.1.2 Healthcare Cost

The City's annual total cost for the electric departmental healthcare cost is $741,327.00; Note, this does not include the employee portion of healthcare cost.

4.1.3 Pension

The City of Fountain retirement is through Colorado County Officials & Employees Retirement Association (CCOERA) and participates in a mandatory retirement plan through a 401 (a) plan for all of our employees. Contribution amounts to the Retirement Plan are established by the City of Fountain. The City's contribution is a minimum of 3% of employee's compensation, but may be increased beyond the set amount. All eligible employees are required to contribute an amount equal to the contribution made by the City. Currently pension is 4.50%, for a total of $94,766.96 at the current employee count.

In addition, there are two additional voluntary contribution plan options for employees to participate in to increase retirement benefits.

- **Option 1**: They may make contributions on an after-tax basis up to one-hundred percent (100%) of their compensation (after normal deductions) through an After-Tax Voluntary Contribution to the 401 (a) plan, subject to the annual total 401 (a) contribution limit, reduced by the total contributions made through the City's qualified plan in adherence to the current plan limits. Taxes are paid on these monies before they are contributed, so no taxes are due on these contributions upon receipt of the account. However, the investment return earned on these contributions will be taxable when the account is distributed, only on the amount of earnings withdrawn.

- **Option 2**: CCOERA 457 Deferred Compensation Plan, employees that contribute to this plan make contributions on a pre-tax basis instead of an after-tax basis which is the case for Voluntary Contributions to the 401(a) Retirement Plan.

4.2. Aging infrastructure

A significant portion of the electric infrastructure being utilized on the system has reached 40 years of age. There are ongoing maintenance programs in place to ensure reliability on the system and prepare for future needs. These programs are:

- **Service Upgrades**: Where underground services have reached their life expectancy and are failing.
- **Primary/Secondary Conduit**: All new electric cable is installed in conduit so that we can pull in new cable when the cable fails.
- **Jacketed Primary Cable**: Fountain specifies an overall polyethylene jacket on 3 phase and URD cable. This protects the cable from damage and slows the ingress of water.
- **Front lot construction**: Fountain now requires all new developments to be constructed with electric facilities adjacent to roads. This reduces outage time and improves safety when compared to rear lot construction.
- **Pole Inspection, Testing and Treatment Program**: Currently through Osmose Utilities, to ensure the reliability of the overhead portion of our system and identify poles that need to be changed out in an expedited manner.
- **Underground cable rejuvenation:** Used to prolong the life of existing underground lines where appropriate.
- **Direct Buried Cable Replacement**: Used when rejuvenation is not an option or cable has 3 or more faults per segment.
- **Annual Substation equipment testing and maintenance**: Performed to ensure safe operation of equipment and prolong equipment life.

4.3. System Expansion

In 2011, the utility conducted a 10 year load forecast to ensure the systems adequacy to serve future load. This study projected system load increases through 2021 and was based on historical average load increases, including existing customer load growth and the addition of new customers. The report estimated the existing peak load in the area under study will increase from its October 2010 peak level of 44 MW to 83 MW by 2021. This anticipates an average compounded growth rate of 6.4%. Starting in 2014/2015 we increased our capacity at the North Fountain Substation by 20 MW, with remaining capacity increases to be gained through the addition of new substations and/or upgrades to other facilities. Below, find the proposed development plans that the City of Fountain Electric Department is currently aware of, as well as their estimated loads on the electric system at full build out.

Almagre Development – anticipated load at build out 9.84 MW

- 1,866 Single-Family Residential
- 620 Multi-Family Residential
- 17 acres – Commercial

Countryside South– anticipated load at build out 1.74 MW

- 577 Single-Family Residential

Crescent Canyon– anticipated load at build out 3.44 MW

- 349 Single-Family Residential
- 283 Townhomes
- 272 Multi-Family Residential
- 7.5 acres – Agricultural (Commercial Wholesale Greenhouses)

- 14 acres - Commercial

Johnson Ranch– anticipated load at build out 1.94 MW

- 635 Single-Family Residential

Kane Ranch– anticipated load at build out 22 MW

- 4,838 Single-Family Residential
- 1,464 Multi-Family Residential
- 1,046 Mixed Use
- 246 Townhome Units
- 800 Multi-Family Units

Ventana Development– anticipated load at build out 2.24 MW

- 508 Single-Family Residential
- 86 Multi-Family Residential
- 6 acres – Commercial
- 4.75 acres Industrial

The map below in **Figure 19**, outlines the aforementioned above outlined future residential / commercial / industrial development plans:

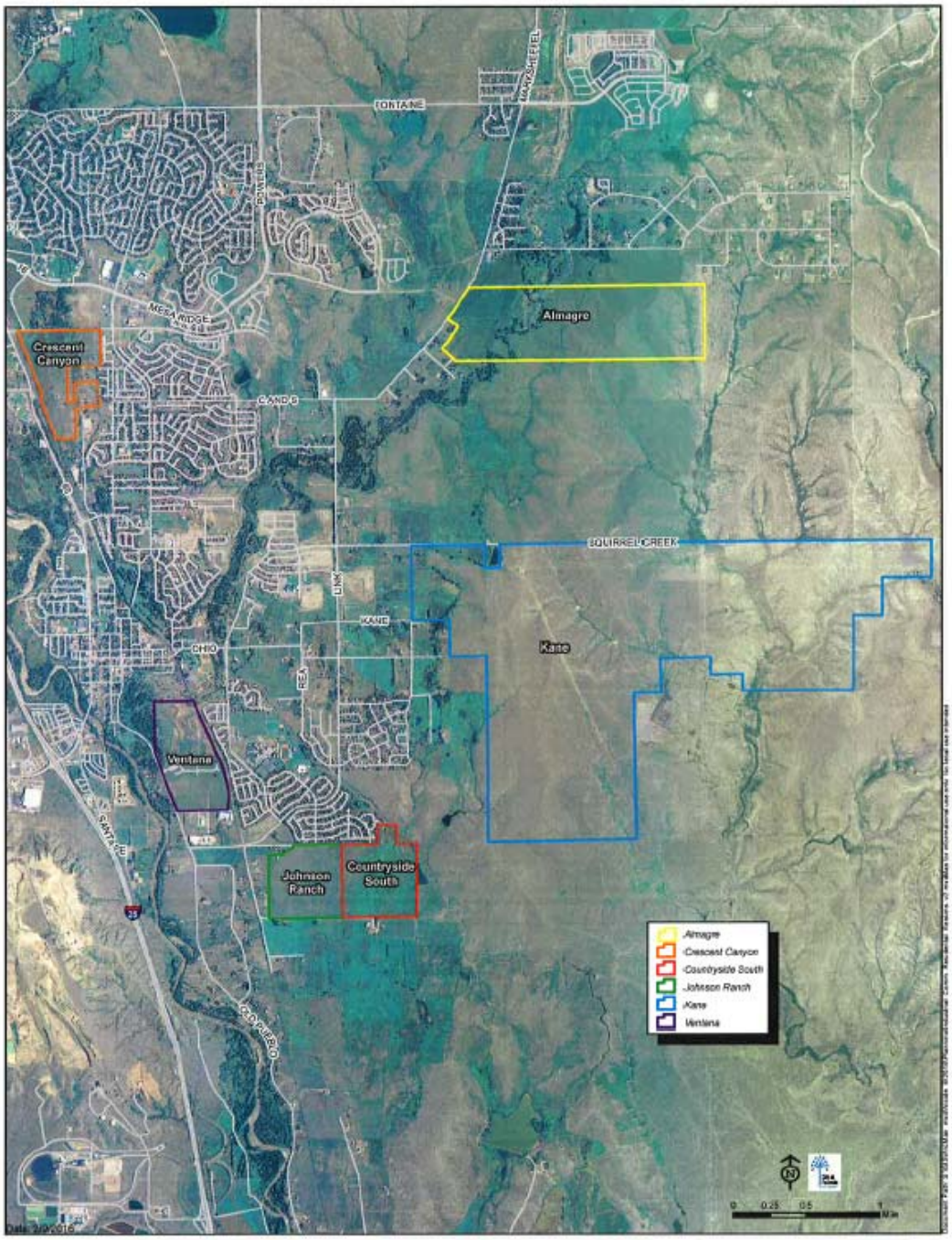
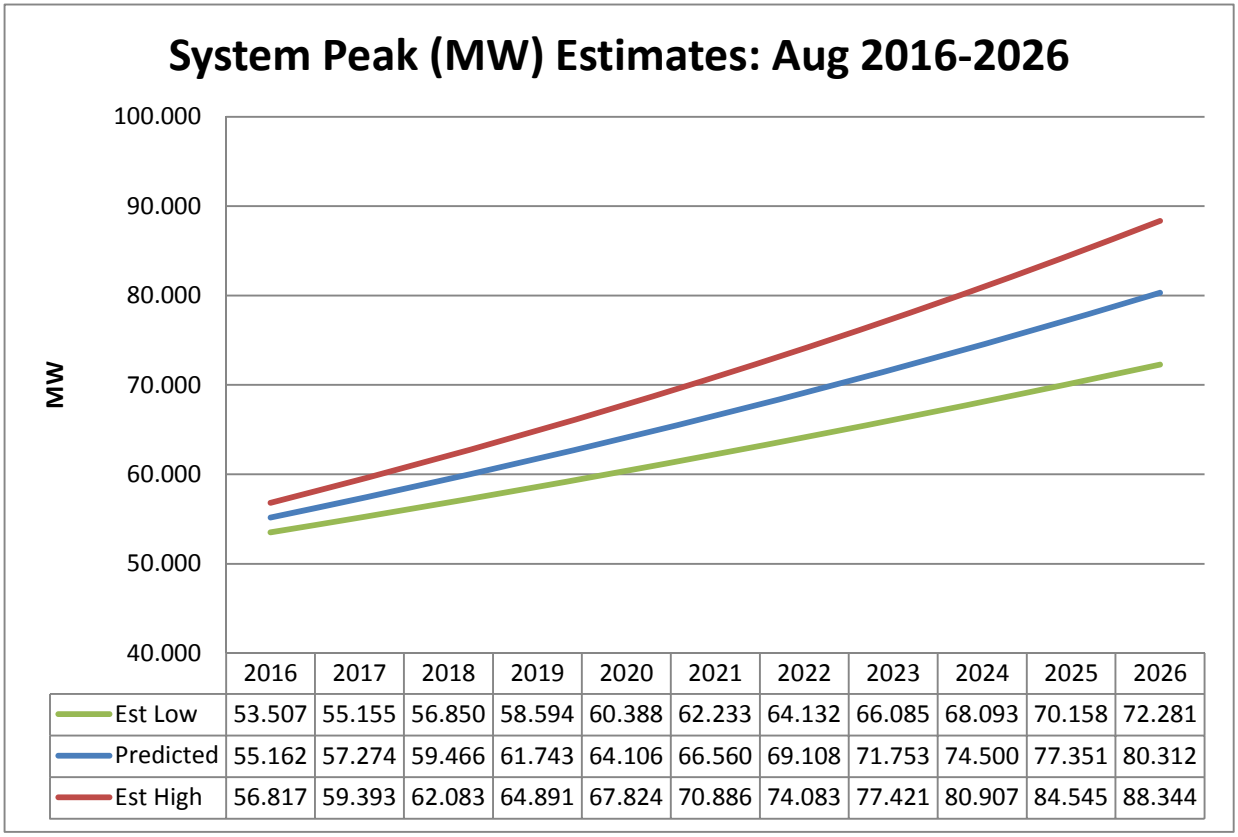


Figure 19: Development Plans Map

The Electric Department has created a peak load forecast for Fountain through 2026 to study system expansion. Below in **Figure 20** the forecast is shown; note that the peak occurs in the month of August each year.

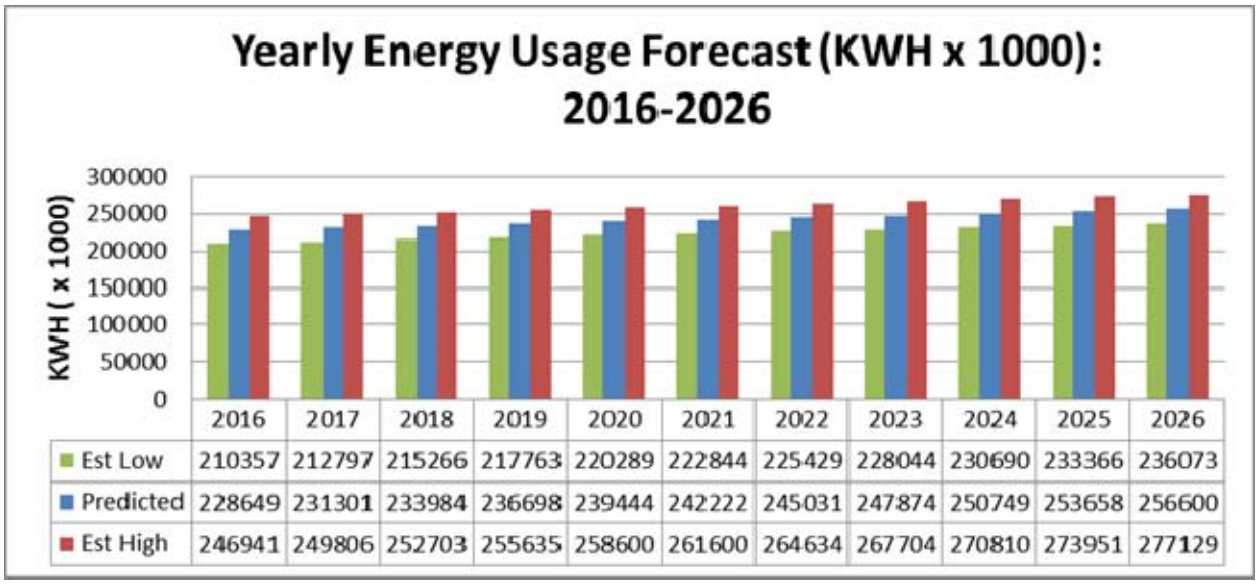


	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Est Low	53.507	55.155	56.850	58.594	60.388	62.233	64.132	66.085	68.093	70.158	72.281
Predicted	55.162	57.274	59.466	61.743	64.106	66.560	69.108	71.753	74.500	77.351	80.312
Est High	56.817	59.393	62.083	64.891	67.824	70.886	74.083	77.421	80.907	84.545	88.344

Figure 20: Peak Load Forecast for August 2016-2026

The system peak shows the highest amount of power the City of Fountain's electric system is using at a point in time. The system peak, also known as peak load, varies based on time of year as well as time of day. The peak is usually highest when customers are using a lot of power at the same time because the energy needing to be delivered in that instance of time is high. Power has the units of Megawatts (MW). As shown in the above forecast, the City of Fountain will have an increasing peak load forecasted to reach the highest in 2026 at 80 MW. The data for this graph can be found in **Appendix A-Data Table 3**. Note, this forecast is based off of City of Fountain Historic Peak Load Data from 2010-2015.

The Electric Department has also created an energy usage forecast for Fountain through 2026 to further study system expansion. This forecast can be found below in **Figure 21**:



	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Est Low	210357	212797	215266	217763	220289	222844	225429	228044	230690	233366	236073
Predicted	228649	231301	233984	236698	239444	242222	245031	247874	250749	253658	256600
Est High	246941	249806	252703	255635	258600	261600	264634	267704	270810	273951	277129

Figure 21: Peak Load Forecast for August 2016-2026

As shown above, the KWH usage is forecasted to increase steadily from 2016 to 2026. In this 10 year forecast the usage is predicted to increase by 27,951 KWH (x1000) over the next 10 years. The data for this graph can be found in **Appendix A-Data Table 4**. Note, this forecast is based off of City of Fountain Historic Energy Usage Data from 2010-2015.

4.4. Customer survey/satisfaction info

The City of Fountain has a great relationship with our customers and values our customer's' opinions; making customer service a top priority. Two of the ways we continue to cultivate this relationship with our customers is through written and electronic communication as well as education and training. Not only do we interact with customers on social media sites, but we provide educational opportunities to ensure they have the most up to date information on projects in the area, safety techniques and conservation techniques, and workshop opportunities to give them control over their energy consumption. This ultimately ends up saving them money while reducing the city's carbon footprint.

In addition, to our day to day communication with our customers, the city completed a residential customer satisfaction survey in June 2012. This survey reached out to 600 residents within the electric utility service area to determine awareness of, and attitudes toward, electric utility issues and the views of City of Fountain Government. Results of the poll are shown below in the following figures.

Organization	Very / Somewhat Favorable	Very /Somewhat Unfavorable	Don't Know
Fountain Utilities Department	78%	13%	10%

Figure 22: Favorability of Fountain Utilities Department

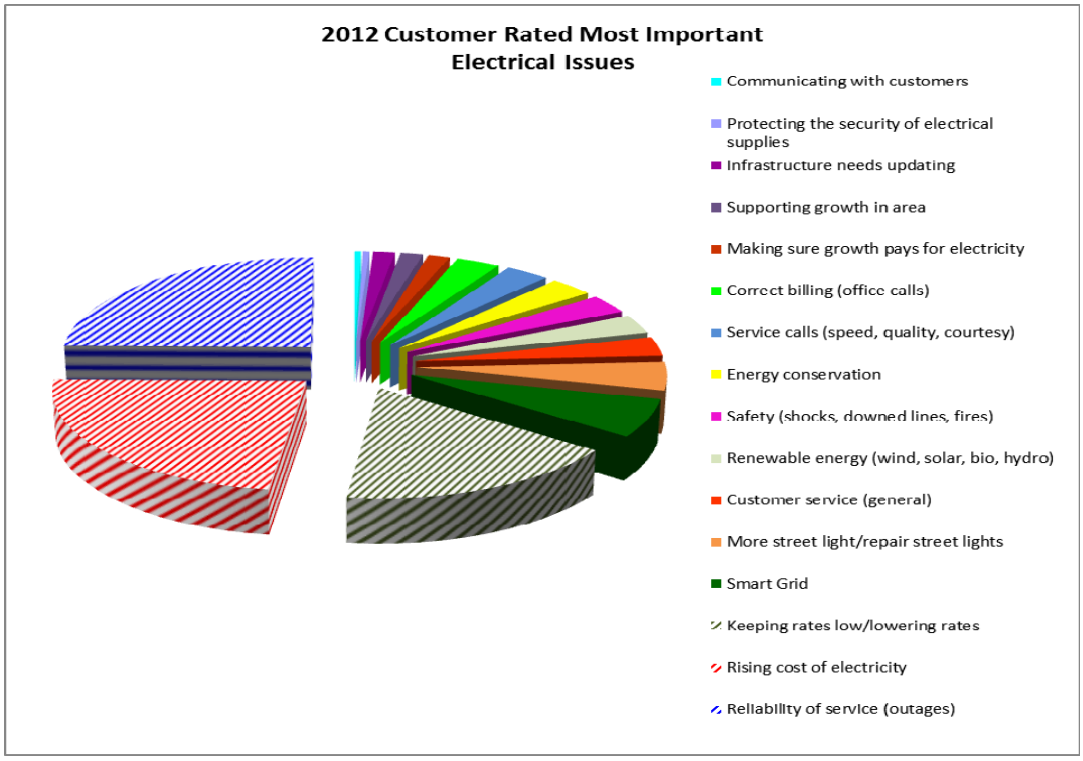


Figure 23: Customer Rated Most Important Electrical Issues.

Note: The above chart only reflects the most important electrical issues rated by our customers. The statistics received for "none", "other", and "declined to respond" are not included.

4.5. Maintenance Cost Drivers

The following topics outline what the City of Fountain Electric Department has identified as maintenance cost drivers for the electric system:

- **Increasing community / territory size = higher demand:**
  Growth in demand for electric power will drive increased investment in the overall electric infrastructure serving our customers. Fountain expects to continue growing and the continued increase of penetration of electric appliances in homes, the proliferation of the Internet and a growing number of at-home workspaces, will have a direct impact on electric demand on the existing electric system. This demand growth will require significant investment in the electric infrastructure to improve the performance of the existing system, ensure reliability and expand the overall infrastructure for our electric system.

- **Aging infrastructure:**
  Fountain's power delivery system is characterized by an aging infrastructure and largely reflects technology developed in the 1970's or earlier. Although it seems wasteful to replace old equipment before it fails, the possibility of drastic increases in equipment failures is unacceptable. In order to avoid power outages from component and equipment failures, apparatus that has reached its life expectancy may require replacement or renewal to continue the reliability our customers depend upon.

- **Trees in overhead areas:**
  The cost of line clearance operations near overhead lines is a substantial part of Fountain's operation and

maintenance expenses. While Fountain has an annual line clearance program on a 3 year cycle, it is difficult to predict how the changing weather climate will affect tree and vegetation growth in any given year. A periodic review of tree related outages is used to modify the trim cycle to maintain system reliability.

- **Infrastructure supporting technological innovation (e.g., grid modernization) and cybersecurity:**
  It's necessary to provide constant maintenance and upgrades of our electric infrastructure. It needs constant upkeep to maintain safe, consistent service and upgrading to improve reliability related to aging infrastructure. We continue to evaluate new technologies to reduce our overall costs.

- **New Technology:**
  Both capital and operating & maintenance costs are driven by the choice of technology utilized to service the electric service territory. A key factor in choosing technology that best suits our system's needs is based on the scale of operation required, investment, and peak operating time periods to ensure that we are able to provide the best reliability to our customers. New technology is implemented as the aging infrastructure must be replaced and is no longer able to be upgraded to meet the growing needs of our system.

- **NERC (North American Electric Reliability Corporation) Compliance:**
  Because Fountain is currently considered a radial load serving entity and is not part of an interconnected transmission system, it has not had to file compliance plans for any of the NERC standards. As Fountain's transmission system grows and becomes part of the region's interconnected system, Fountain will have to develop compliance standards for specific NERC regulations. There will be a significant financial impact when Fountain is required to implement additional NERC Standards.

5. Mission/goals/objectives

Since 1999, it has been our mission to meet the current and future needs of our customers by providing reliable, cost effective energy and services, in a responsible, courteous and efficient manner. Our vision of providing power through a modern, reliable system, by seeking competitive, affordable, environmentally friendly sources of power and providing friendly, timely service to our customers has been consistently met over the years through our operating philosophies taking priority.

These philosophies include ensuring high quality, reliable electric power by identifying, encouraging, and supporting sustainable energy sources to supplement existing generation. Promoting customer relations via good communications and service by remaining customer-focused; always seeking to improve the way in which we deliver services; and ensuring safe working conditions by encouraging and providing opportunities for professional and personal development through training and safety based policies and procedures.

Striving to meet issues and challenges head on to ensure reliability of the electric system through the continuous upgrades in established areas of the electric system; meeting future electric load demands by supplementing purchased power generated by sustainable energy sources; maintaining a well-trained, dynamic work force; and meeting and/or exceeding industry standards through the development of good safety practices and communication protocols.

5.1. Financial/Rates

It is important to the City of Fountain that the electric utility be financially strong, a leader in promoting energy efficiency and the use of renewable energy sources, as well as, continuing to provide our customers with the most cost effective rates possible. Historically, these rates have been some of the lowest and competitive along the Front Range for both residential and commercial accounts.

As our electric power is purchased wholesale, the city has kept our rates low through the thorough, rigorous evaluation and negotiation processes with wholesale suppliers to obtain longer contract terms of service, lower wholesale power costs and long term rate stability. Once each of these key components are identified and meet the criteria the city requires, we pass along these savings to our customers.

5.2. Reliability

The City of Fountain began providing electric power to its community in 1919, now 97 years later, our electric utility continues to provide exceptional reliable service for our city and surrounding customer base in the Fountain Valley area. We have a strong commitment to safety, integrity, accountability and adaptability. As our system continues to grow, we meet the challenges that come with a greater load, supplying safe, clean, reliable electricity with the highest dedication to customer care. To accomplish this, we bring together collective leadership, experience, judgement, and skills and technologies to enhance the existing infrastructure; we also integrate sound mandatory reliability standards in the most timely and efficient manner. Using these guiding principles we strive to be open and transparent with our customers through clear communication on the future plans for our utility.

One of the ways we are continuing our legacy of reliability to our customers is through the recent update of our Electric Code and Regulations. These updates established a threshold of requirements ensuring that electric service is planned, operated and maintained in a manner that minimizes risks of cascading failures, avoids damage to major equipment and limits interruptions of bulk electric supply. The Electric Code and Regulations will be reviewed every

five years to ensure we continue to meet the needs of our system and community.

In addition, we promote a culture of reliability excellence through risk-informed compliance monitoring and enforcement. Through retaining and refining our ability to use standards enforcement, we can ensure the sufficiency and effectiveness of our system, modifying as needed. This constant development of standards, review of industry standards, and implementation of practices, procedures and controls to address reliability risks for our system assures the continued dedication to excellence.

5.3. Customer service/satisfaction

Providing exceptional customer service to achieve the highest level of customer satisfaction is paramount at the City of Fountain.

This is accomplished though clear communication with our customers; ensuring safe, reliable, efficient and environmentally responsible energy delivery. By utilizing new and innovative technology to enhance performance, we give our customers the ability to participate in various energy rebate programs, conservation opportunities and the capability to reach our utility through several avenues 24 hours a day, seven days a week.

In addition, by developing a diverse and highly capable employee base, we are able to provide a more tailored service to meet our customer's expectations. From our customer service office, to our employees that work out the field, it is our commitment to provide each and every person we meet with the highest level of professionalism and ethical conduct, meeting or exceeding the expectations of our community and responding to customer concerns in the timeliest manner possible.

6. System Expansion Requirements

6.1. Service standards and system planning criteria

The City of Fountain Electric Department aims to deliver safe and reliable electric service to all customers on the City's grid. By following the most up to date City of Fountain Electric Service Standards and Codes (updated and approved in March 2016) as well as electrical industry standards such as IEEE, ANSI, and NESC, the City of Fountain Electric Department can deliver safe and reliable service. Maintain competitive rates and customer satisfaction.

Taking regulations, codes, and the above criteria into account, the City of Fountain Electric Department has developed system planning criteria to ensure safe and reliable electric service. The key elements of the planning criteria are:

- For planning purposes substations will be spaced at 2 to 2.5 miles to ensure adequate electric service to all customers.
- Future main line will be comprised of underground 600 amp capacity every mile in conduit to ensure reliability & future maintenance efficiency.
- All residential services will be 200 amp capacities, served from front lot line, redundant looped primary system to ensure reliability.
- System planning criteria to meet operational rate and financial goals will be established through systematically prioritizing expansion development projects and their supporting budgets to meet the needs of our community as determined through the increasing demand and evolving operational practices.

6.2. Regions of anticipated growth

The City of Fountain continues to grow to the east and south of the current electric service territory. There is also potential for load growth on the west side of I-25. **Figure 24** below anticipated growth and our current ability of service.

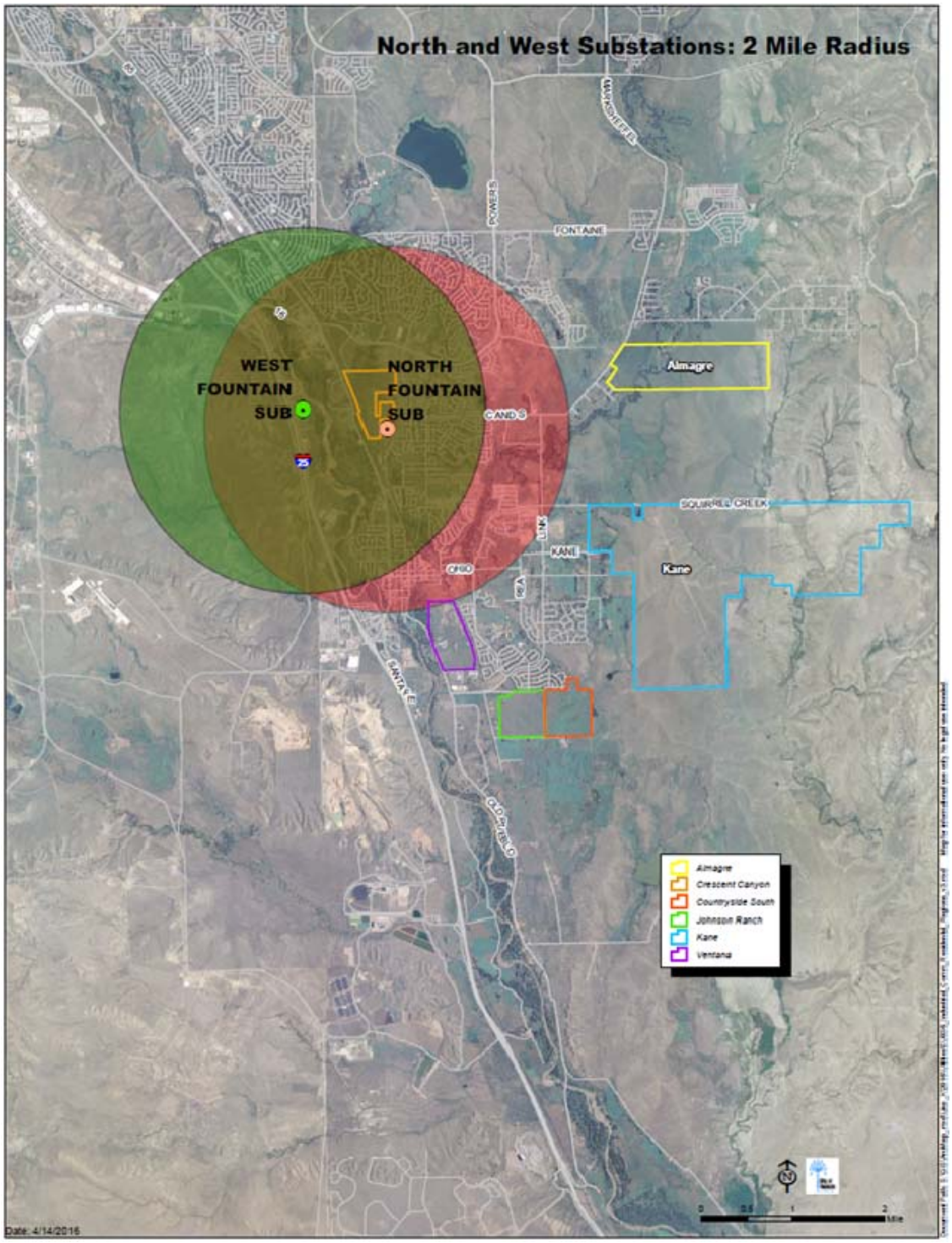


Figure 24: Current ability of service and anticipated growth

6.3. Additional substations required

At the current growth rate anticipated, we are projecting an additional three substations will be required to meet the load requirements. **Figure 25** below shows the anticipated service areas of the additional three substations

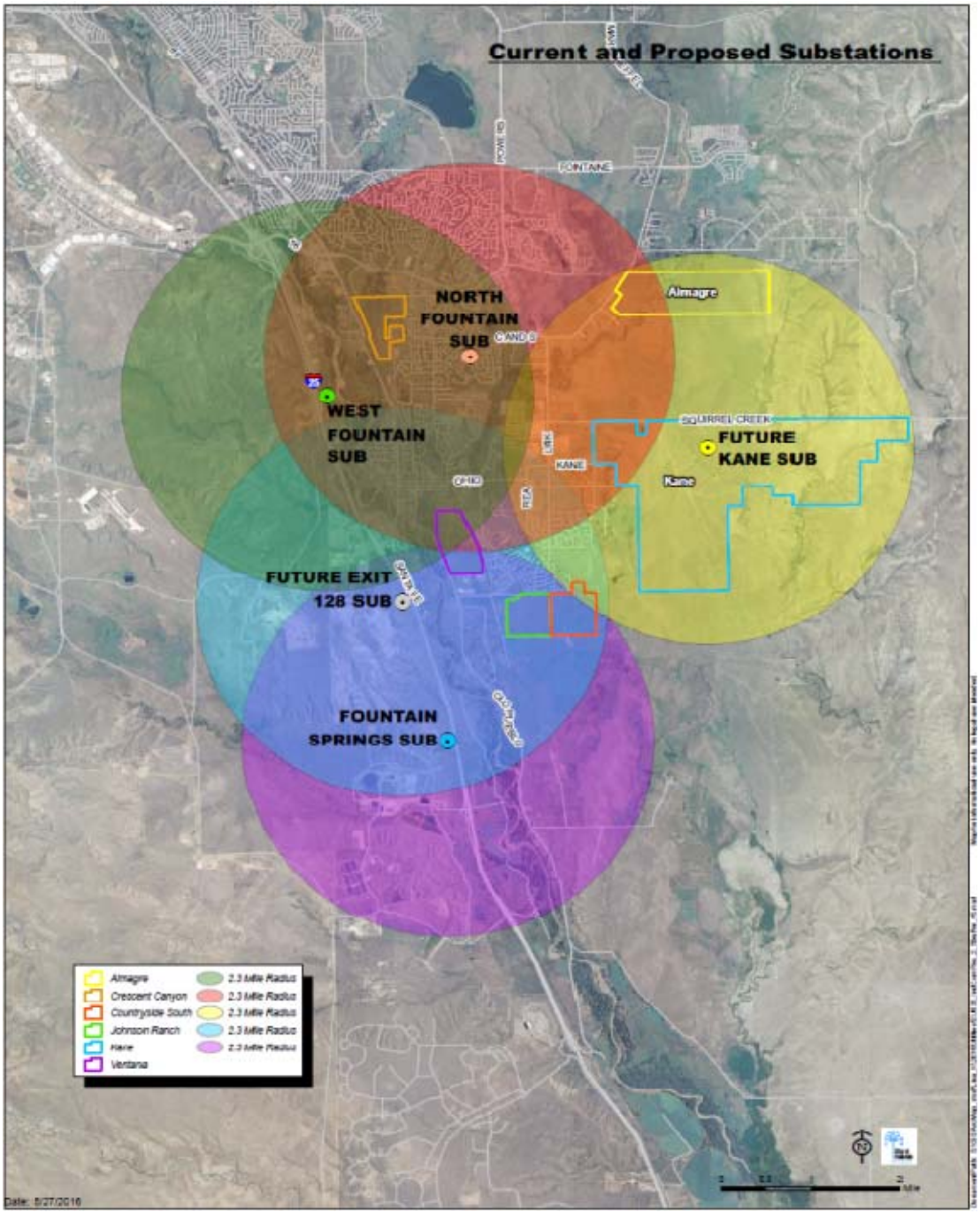


Figure 25: Current and proposed substations

This map shows the future substations needed to support the future developments the Electric Department is currently aware of.

6.4. Additional transmission needed

To ensure reliability of Fountain's power grid, a transmission loop from Midway Substation, located South of Fountain, will be needed. This loop will connect to the Kane Substation which will provide Fountain with the ability to receive power in two different configurations ensuring reliability. This is the overall long term plan for the City of Fountain's electric grid; this plan will be phased in over several years and into stages based on the development of the City and its certificated territories.

The first stage in developing the transmission loop will be installing the Kane Substation to support the Almagre development. This will require 115kV transmission line running from North Fountain Substation to the new Kane Substation.

The other stages of developing the transmission loop and other substations will develop as the City and its certificated territories develop. This plan will be updated accordingly.

6.5. Additional distribution needed

The distribution system required to support the City of Fountain's electrical needs will be based on the new developments and infill of currently vacant areas within the existing city and its certificated territories. To ensure reliability, all future distribution will be loop fed and have backup capability.

6.6. Interconnection to other utilities

There are multiple Transmission system interconnection opportunities for the City of Fountain. Future studies will be completed to plan Fountain in the optimization of its transmission infrastructure.

6.7. Impact of Fort Carson

The economic impact of Fort Carson is the most significant component, accounting for nearly $2 million in annual economic impact to the region and the state, with the City of Fountain and unincorporated Security/Widefield which are located just east of Fort Carson, being the most highly impacted areas by Fort Carson's growth rate. The number of Fort Carson troops has more than doubled between 2006 and 2013 as a result of various Department of Defense initiatives. Through the Colorado Defense Mission Coalition and partnership groups the City of Fountain has gained more knowledge about Fort Carson's issues and needs, as well as a greater understanding of the impacts that affect future housing decisions, commuting patterns in the region, and the need for more off post services. With these future needs, come greater load requirements for the Electric utility to provide services for the additional businesses and larger bedroom communities for our military neighbors. After thorough information-sharing, monitoring trends, and recommendations, the following key issues have been identified:

- Child Development
- Education (pre-K-12)
- Health / Behavioral Health
- Housing
- Quality of Life/Sustainability
- Social Services

- Transportation
- Workforce/Adult Education

These key factors demand the utility prepare for long-term plans to increase the utility infrastructure. These challenges necessitate timely and accurate data from Fort Carson and other sources regarding the timing of the arrival of additional troops, their family members and more detailed demographic data.

6.8. Facilities, Support Systems, Equipment

Electric Department facilities, support systems and equipment encompass a broad spectrum of services required to assure the performance for which each electric facility / infrastructure system was designed and constructed to do meets not only industry standards, but functions to meet the expectations our customers demand.

6.8.1. Service Center, Warehouse & Yard, Control Center

The City of Fountain Electric Department currently occupies a combined service center and warehouse with a yard. In the future, the Electric Department plans to relocate our service center, warehouse, and yard, to accommodate our current needs. Future system expansion and system reliability requirements will dictate the design and construction of a continuously staffed Electric Department Control Center.

6.8.2 Work & Materials Management

In 2016, the Electric Department will begin implementing a new work order and materials management system from Harris Company. This system will keep track of all Electric Department's assets and work orders. Currently, our operations and maintenance division complete day-to-day activities that are necessary for electric facilities/infrastructure, its systems and equipment to perform their intended function at peak efficiency. As the number, variety and complexity of our facilities / infrastructure systems increase, we will need to adapt in size and complexity to ensure that mission performance is sustained. This requires a knowledgeable, skilled and well-trained employee base and a well planned maintenance program. We have designed our programs to:

- Reduce O&M repairs
- Reduce unscheduled shutdowns and repairs
- Extend equipment life, thereby extending facility/infrastructure systems life and lowering capital costs.
- Realize life-cycle cost savings, and
- Provide safe, functional systems and facilities to meet the system design intent.

6.8.3. Line & Substation construction, testing, maintenance

The Line Construction Standard for the Electric Department is as follows:

- In the near future, the Electric Department would like to have portable substations and portable generators to support its future substations.
- Main Line: 15 KV, 1000 MCM underground cable, 477 overhead conductor
- Secondary Line: 4/0 cable to junction boxes, 2/0 cable to houses
- Structures: The Electric Department uses and constructs its own structures based on the Fountain Electric Construction Specifications and Standards plan
- Distribution equipment is tested periodically as specified by industry standards

The Substation Construction Standard for the Electric Department is based on a case by case

dependency. The overall criteria the Electric Department conforms to is as follows:

- Low profile metal clad switch gear
- Substations are built to blend into surroundings
- Substation transformers will be operated to run at -75% capacity under normal conditions
- Design for 2 transformers per substation
- Design for 3 distribution circuits per transformer
- All substation equipment is tested periodically as specified by industry standards

6.8.4. Test & Maintenance records system

The Electric Department currently utilizes both hard and digital records systems for the testing and maintenance programs described above. This data is used to track the general condition of the equipment used.

6.8.5. Vehicle maintenance

The City of Fountain Electric Department is unique as it has direct access to and supervises the City of Fountain Fleet Department. This provides a distinct advantage for the utility, as the fleet division provides essential maintenance and repairs to all vehicles and equipment. Currently, the Electric and Fleet Departments share the same building, as such the response times for electric equipment needs are able to be expedited; maximizing uptime so crews stay productive and customers stay satisfied.

6.8.6. Core Technologies/applications

The City of Fountain Electric Department utilizes many technologies in day to day operations. Below are a few of the core technologies:

- SCADA: monitors and records data from the substations and allows for remote operation of some substation equipment
- Milsoft: Engineering Analysis and modeling
- ArcGIS: used to create a visual representation(map) of the City and the system to include all circuit components and details about those components
- Yukon and Electsolve: retrieve and store meter data and also provide the ability for remote disconnects if this is a feature on the meter

6.9. Personnel and Equipment

As Fountain's electric system continues to expand including the construction of additional transmission lines, distribution and substation infrastructure, additional personnel and equipment will be required. Operational requirements (24/7 coverage), transmission maintenance, substation testing and maintenance requirements will dictate the need for a more technically diverse workforce.

7. Staff

7.1. Fountain Electric Organizational Chart

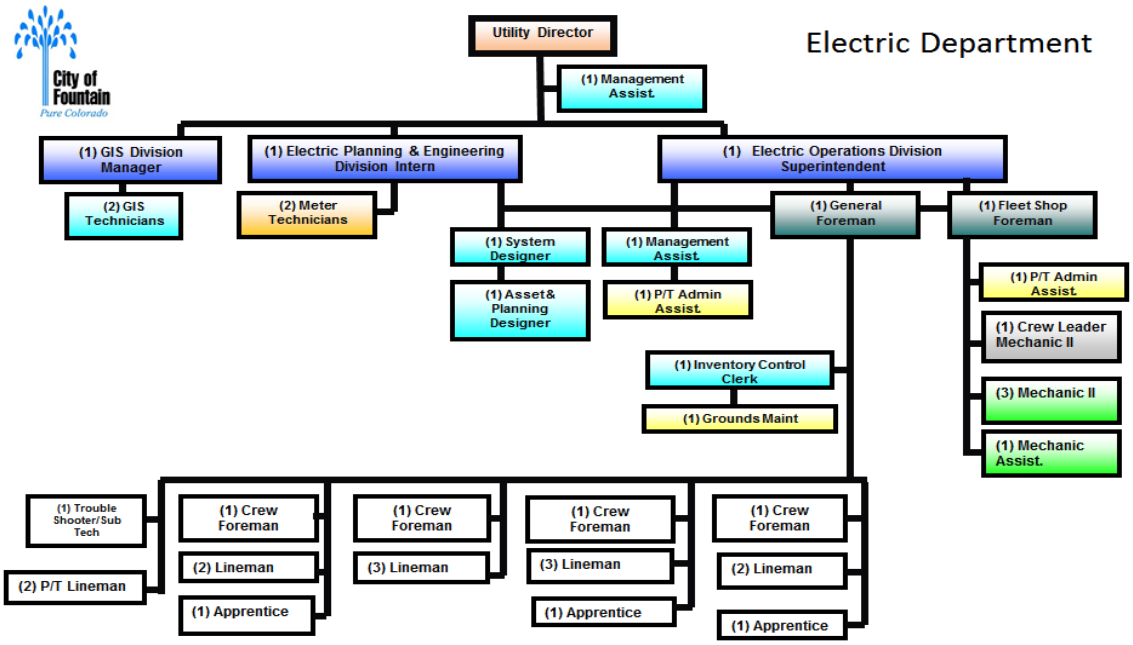


Figure 26: Fountain Electric Organizational Chart

7.2. Current Staffing Levels and Classifications

Director -1

Superintendent -1

Electric Engineer - 1

General Foreman -1

Line Crew Foreman – 4

Journeyman Lineman – 9

PT Journeyman Lineman - 2

Apprentice Lineman – 4

Electric Trouble shooter – 1

Asset Planning Designer – 1

Distribution System Designer – 1

Meter Technicians - 2

Management Assistant – 1

PT Admin Assistant – 1

Inventory Clerk – 1

Warehouse Maintenance Worker – 1

7.3. Retention/turnover info

Over the past 5 years, the Electric Department has experienced a turnover rate of 11.33%. The voluntary separations from the city consisted of 8 Journeymen Linemen and Apprentice Linemen accepting a higher rate of pay and enhanced retirement benefit package from neighboring utilities and 4 Crew Foremen and Journeymen Linemen retiring. In 2015, the Electric Department had a retention rate of 88.7%. Addressing the challenges of retaining a highly skilled employee base is imperative to the success of maintaining our infrastructure, regulating timely responses to trouble calls within acceptable parameters, and achieving a field staff familiar with and committed to the surrounding community. The Electric Department believes the key to achieve retention of employees begins with improving compensation to a competitive level for certain positions, rewording employees for safe work behaviors, and investing in additional employee training opportunities.

7.4. Training and Safety functions

The City of Fountain Electric Department is committed to being a leader in safety. We exercise constant vigilance to achieve job site safety for the protection of our employees and our community. Our field personnel participate in daily job site safety meetings before starting every job and each crew member ensures compliance with safety policies and procedures. In addition, employees receive regular instruction on safety awareness at monthly meetings where they are encouraged to make suggestions to improve safety programs and procedures. The prevention of occupational-induced injuries and illness is one of our guiding values.

In an effort to keep our community aware of electric hazards, we attend several public events every year with the presentation of Power-Town to highlight safe practices around electricity, provide hand-outs for all ages, and contact information for the utility, to address any questions or concerns our community may have. Our community can also find safety information on our City website.

7.5. Worker Safety

The City of Fountain has maintained a superior safety record with no accidents occurred causing time to be missed. Sustaining this standard of excellence may become a challenge if turnover rates continue to rise.

8. Regulatory Environment

8.1. Fountain future energy requirements

As the City of Fountain continues to grow and expand, the energy requirements to power the city and its territories will increase. With this energy requirement increase, the Electric Department will need to consider all generation options to include (but not limited to): joint power plant, wind, solar and/or hydro generation, and other purchase power agreements in the future.

8.2. Renewable energy requirements/goals

The City of Fountain currently has no renewable energy requirements. The renewable portion of our energy supply comes from the Western Area Power Authority (WAPA) allocation which represents 3% of our total energy needs.

The City of Fountain has a net metering policy that allows customers to install approved renewable energy resources. Currently we have approximately 23 customers with rooftop solar panels.

8.3. Advantages of AMI implementation on grid security

With matching funds from the Department of Energy's Smart Grid Investment Grant, Fountain Utilities has installed the foundational components associated with enhanced operation of its electric grid. The emergence of Smart Grid systems holds promise but requires innovation and deployment of ongoing technologies, processes and policies. Composed of many independent systems, the enhanced grid will continue to evolve by integrating existing components of automation to achieve value through the delivery of information to customers, grid operators, and utility companies. A reliable and secure enhanced grid holds the promise of enabling automated demand response, providing customers a myriad of options to manage their energy costs through technology enabled programs along with limiting outages with a self-healing transmission and distribution network as well as other strategically important functions.

8.4. National Standards, Federal Energy Regulatory Commission (FERC), North American Electric Reliability Corporation (NERC)

The Federal Energy Regulatory Commission (FERC) selected the North American Electric Reliability Corporation (NERC) as the nation's Electric Reliability Organization (ERO) and gave them the task of developing and implementing regulations that would enhance the reliability and security of the interconnected electric power systems in the United States. These regulations are detailed and comprehensive, reaching into every facet of electric utility operations. The NERC has promulgated over 100 standards covering resources, communications, critical infrastructure protection, emergency preparedness, planning, and coordination with other utilities.

Because Fountain is currently considered a radial load serving entity and is not part of an interconnected transmission system, it has not had to file compliance plans for any of the NERC standards. As Fountain's transmission system grows and becomes part of the region's interconnected system, Fountain will have to develop compliance standards for specific NERC regulations.

The National Electrical Safety Code (NESC) is a national performance standard that specifies requirements for the safe construction and operation of utility electric power systems. The NESC traces its origins back to the 1913 editions of the National Bureau of Standards. Today's NESC is considered the basic standard for the safe design, construction and operation of electric power systems in the U.S.

Fountain has and will continue to design, construct, and operate its electric power system in compliance with the NESC.

9. Regional Influences

9.1. CSU future plans

Fountain recently met with the planning team at CSU to discuss future challenges the two utilities face. CSU is facing a major challenge in the decommissioning of the Drake power plant by 2035 and finding alternative support for the load the power plant currently carries. The two utilities discussed a regional approach to electric power supply and possible partnership in transmission in the future. Fountain and CSU will stay in contact as these challenges unfold to discuss possible solutions.

9.2. Mountain View Electric customers in Fountain service territory

MVEA currently serves customers within Fountain's certificated electric service territory through a franchise agreement. This situation exists because Fountain does not have electric system infrastructure in place to conveniently or economically serve these customers.

Based on periodic economic evaluations, as Fountain's electric system expands, these customers will be served by Fountain.

9.3. Impact of other utility services, water, wastewater, gas, communications

Within Fountain's certificated electric service territory, there are several other utility companies providing service to Fountain citizens and Fountain electric customers. These entities will be impacted by any expansion of Fountain's electric system. Close coordination with these other utility operations throughout the planning process will be necessary. Fountain will engage and involve these other utilities as appropriate.

9.4. Joint use (pole attachment agreements)

The only joint use the City of Fountain Electric Department allows is for pole attachments. These are completed through an application process, thorough review of the poles that would be affected by the attachment, and finally an agreement with each entity that wishes to attach to our poles. These entities then pay a yearly fee to the City as compensation for the added maintenance to the pole that may be required due to the additional weight and pull added by the entities attachment. Each entity is responsible for the maintenance of their equipment accordingly.

9.5. Consideration of a regional approach to energy (similar to SDS)

In the past Fountain has partnered with other regional entities on large utility projects that benefit Fountain and other regional entities. These partnerships have primarily involved water delivery projects such as the Fountain Valley Authority and the Southern Delivery System.

A similar approach on future electric transmission and electric supply resources may provide Fountain with opportunities to efficiently and economically provide electric service to its customers in the future.

Fountain recently met with leadership at Colorado Springs Utilities (CSU) to open the discussions around regional electric supply and transmission options.

10. Stakeholders

All successful participatory planning requires the involvement of concerned stakeholders. This includes identifying public concerns and values to develop a broad consensus on planned initiatives. This requires the utilization of the vast amount of information and knowledge that stakeholders possess to find workable, efficient and sustainable solutions. By developing the following stakeholder structure, we are able to interact, communicate and involve the identified stakeholders during each phase of our projects through building and maintaining positive relationships, as well as defining who should participate in what ways and at what stage of the project cycle stakeholders should be involved.

10.1. Fountain citizens and customers

As a local company, the City of Fountain Electric Department remains committed to the prosperity of the communities we serve and the characteristics that make each of them unique by providing the energy used to build their homes, businesses, farms and families. Engaging with our citizens and customers to determine their needs and address their concerns is paramount to ensuring a clear and concise dialog to achieve safe, reliable, and affordable energy. When new projects are underway that will directly affect the way customers do business with the City of Fountain or how they will receive their energy, every effort is made to inform, educate, and address any questions or concerns they may have. This is done through several forms of communication; open house forums, City Council meetings, updates on social media, informal meet and greet, and publications in local newsletters and papers.

10.2. Fountain City Council

The City of Fountain Electric Department takes great pride in reporting information to our City Council to ensure clarity in our plans and provide measurable accomplishments for our electric utility. We welcome the opportunities to meet with our Council Members to learn more about their interests, challenges, and outside perspectives on how to improve our performance. We encourage open dialogs on national policy, electric regulations, and on issues that impact our community. By cultivating this partnership with our local leadership, we are able to build trust, improve performance, enlighten all concerned parties on proven technological upgrades that are beneficial for our system; and ensure total commitment to the success of our customers, employees, and community in all of our actions. City Council's role as stakeholder guarantees the thorough review of all budgetary and project needs to work in tandem with the Electric Department's legacy of responsible spending, feasibility of projects, and continued accountability to our community.

10.3. Regional Interconnected Utilities

Through comprehensive planning and operational procedures that the City of Fountain has successfully utilized and relied on for decades to maintain system reliability, even in the face of sudden changes in electric industry structure, we have worked closely with surrounding entities to ensure system reliability for our customers. These plans and operational procedures will continue to evolve to meet our system and customer needs. By working with transmission owners, power plant companies, government regulators, reliability coordination organizations, consumer representatives and others to identify changes that may be required in operating standards, market products and practices; the City of Fountain able to identify possible, if not likely, changes in power supplies, and indicating where and when new resources might be needed in the years ahead. These partnerships with our surrounding utility neighbors will continue to be cultivated to preserve and protect our source of power for our customers.

10.4. Regulatory/Permitting Agencies

As a public power municipality, we are governed by our local City Council; however, we still must comply with State and Federal Regulations set forth for the electric industry.

Some aspects of the industry, such as interstate transmission and wholesale power sales, are federally regulated; while others, such as retail rates and distributions service, are state-regulated; and some, such as facility siting and environmental impacts, may be regulated locally.

Currently, the City of Fountain does not own or operate a power generation facility and are considered a distribution-only utility. As such, we currently do not have as many regulations that apply to our facilities; however, we strive to meet all regulations that may apply to our utility in the future. By remaining proactive to meet regulations now, we are ensuring a smooth and fiscally responsible transition in the future when our utility will fall under these directives.

10.5. Fountain Utility Employees

Electricity is more than energy; it is a vital component of infrastructure and an essential part of our everyday lives. Ensuring the safety and reliability of this unique commodity for our communities through a skilled, well-trained workforce is paramount to the City of Fountain. Experience has shown that utilities can only succeed if their employees bring their energies, hearts, and minds to work. They are the front line to the customer and are often a cost-competitive resource, with great ideas and know-how to address challenges met in the field. Employees selected to work at the City of Fountain Electric Department show high integrity and ethical principles in every aspect of their character. By taking responsible actions to ensure the sustainability of our operations and being committed to clearly conveying upcoming project information and budget details available to the public, we are able to have an open dialog with our community when questions or concerns arise. As our electric infrastructure continues to grow and expand, so does the need for qualified employees. This will be accomplished through attending additional training and workshop opportunities, as well as the addition of capable field crew personnel and internal office support.

10.6. El Paso County

The City of Fountain is committed to meeting the needs and exceeding the expectations of all of our stakeholders. The trust and confidence our stakeholder's exhibit in us is essential to our utility. As we provide our customers in El Paso County with safe, efficient and reliable power, we must also collaborate and coordinate with representatives of our county when new sources of infrastructure are required to ensure we are meeting their guidelines as well. Components of power transmission and distribution for today's needs and tomorrow's expandability must meet the needs of not only our utility, but of our surrounding community as well. By engaging our stakeholders, we are able to identify applicable standards, gaps in currently available standards and prioritize new standardization activities that will support both entities efficiently and affectively.

11. Capital and O&M

11.1. Summary of Major Capital Projects 4 year horizon – high level $ Estimates

Cost and availability of capital funding are critical issues for all utilities and influence the nature of how development, upgrades, and phasing of infrastructure improvements are implemented. Decisions to extend the life of existing infrastructure or invest in new infrastructure options are influenced by many factors; including the availability of capital funding, stricter environmental regulations and, more recently, security issues. Significant technological advances in transmission, distribution and use are also affecting management decision making.

As our electric service territory continues to grow and demand for this unique commodity continues to increase, the planning of major projects is vital to ensure efficient use of capital resources, reliable service and to further improve the quality of life for our community. As we look towards the future over a 4 year horizon, we anticipate the following major capital projects are needed to achieve our goals of serving our community with the safest and most, reliable electric service we can offer, while maintaining the best rates available.

Major Capital Projects	Cost Estimate (2016 $)			
	2017	2018	2019	2020
1 System Improvements	975,200	925,000	975,000	1,075,000
2 Buildings	100,000	3,000,000	1,000,000	
3 Construction of 115 KV line	100,000	9,000,000		
4 Substation Construction			7,250,750	
5 Computer Equipment & Software	635,000	85,000	85,000	85,000
6 New Building Apparatus		250,000	100,000	
7 Vehicles	480,000	50,000		
8 Equipment	102,000	100,000		
Total	**$2,392,200**	**$10,710,000**	**$9,410,750**	**$1,160,000**

Figure 27: Projects and Cost Estimates 2017-2020

11.2. Summary of Major O&M Programs

Maintaining the health of existing and future infrastructure on our system is paramount to our commitment of providing excellent reliability, while simultaneously ensuring customer safety and satisfaction on our electric service territory. As we fulfill this standard of excellence that our customers have come to depend upon, yearly major operations and maintenance programs are performed. These operations are imperative and accomplished through the most fiscally responsible avenue possible.

Visual evaluations of potential hazards on our system are considered to be a vital source of information. If an employee reports a potential abnormal condition, a work order is generated and investigated by the troubleshooter so appropriate action can be taken. This information, along with reports from our community, is an added valuable resource in addition to the maintenance program in place.

The programs mentioned above include:

- **Line Clearance Program**

  The overhead distribution line clearance program consists of an annual, three year cycle, planned line clearance operations in strategic areas on the system that coincide with vegetation type, rainfall accumulation totals, and where performance triggers more frequent clearance operations to occur. Any portion of the system that experiences two or more tree related outages in a 12-month period is evaluated for expedited line clearance operations.

  Figure 27 below shows the historic line clearance program cost as well as a projected cost for 2016.

Historic Line Clearance Program Costs	
Project Year	Total Contractor Cost
2011	$ 79,666.00
2012	$ 130,500.00
2013	$ 115,960.00
2014	$ 120,810.00
2015	$ 124,980.00
Project Year	Anticipated Contractor Cost
2016	$ 150,000.00

Figure 28: Historic Line Clearance Operational Costs 2011-2015 and Anticipated Costs for 2016

- **Underground Cable Replacement Program**

The Underground Cable Replacement Program was established in 2007 for areas where underground cable was installed direct bury in the mid to late 1960's and early 1970's when the industry standard moved from an overhead distribution system design to an underground distribution system design.

The need for the replacement program was determined based on the increase of power outage rates due to the deterioration of these direct bury lines caused by the age and type of the cable utilized at installation, ground settling, soil corrosion, thermal loading, water ingress, and other environmental stressors.

In addition, during the implementation of this program it was determined the capacity of the backbone of our underground infrastructure would be increased to accommodate added demand on the system and to ensure reliability. The increase in demand is attributed to technology and creature comforts customers are installing in their homes, therefore providing our community with the ability to increase their service size.

Historic Underground Cable Replacement Program Costs and Anticipated Costs	
Project Year	Total Contractor Cost
2011	$130,586.00
2012	$ 72,484.38
2013	$117,523.00
2014	$121,560.00
2015	$194,820.85
Project Year	Anticipated Contractor Cost
2016	$200,000.00

Figure 29: Underground Cable Replacement Program Costs 2011-2015 and Anticipated Costs for 2016

- **Equipment Maintenance Program**

Ensuring safety, reliability, and accountability to our customers is a fundamental function of our Electric Department. Electrical control and distribution systems are complex and expensive assets that must be thoroughly maintained to achieve optimal performance over their service life.

The key components of this program are comprised of the systematic approach of inspecting, testing, analyzing, servicing equipment, and identifying potential trouble spots on our electric service territory on a routine basis. By taking these pro-active steps in maintaining our system, we are able to provide assurance that protective devices will function properly, reduce risk of equipment failures and complete system

modifications under controlled conditions; ultimately avoiding unplanned expenditures and down time due to emergency repairs or replacements.

- **Pole Inspection, Treatment, and Replacement Program**

With approximately 4,700 poles on our electric distribution system, an annual pole inspection program conducted on a 3-5 year cycle is strictly adhered to. This program involves the visual and physical inspection, treatment, restoration, cataloging data for each pole on the system, and identification of poles for replacement that have reached their life expectancy.

Over the years, these operations were completed by electric crews through a thorough systematic approach, beginning at the older portions of our system, continuing to the newest portions of our system and included wood street light poles.

Inspection of the poles includes the evaluation of the pole's strength, both above and below ground, identification and data collection, ensuring the pole is accurately labeled and reporting minor maintenance items accordingly. Poles that are determined to pass the inspection process are then treated; this includes both internal and external remedial preservatives. Poles that have been determined to have reached their life expectancy are reported immediately to the utility for replacement.

Figure 30 below shows the historic and anticipated cost to complete this program with Osmose Utility Services Inc.

Pole Replacement Program Historic and Anticipated Costs	
Project Year	Total Cost
2015	$98,608.25
Project Year	Estimated Project Total
2016	$138,251.16

Figure 30: Pole Replacement Program Costs 2011-2015 and Anticipated Costs for 2016

11.3. Cost/Benefit

The City of Fountain Electric Department strives to provide reliable service at a reasonable cost through value-based reliability planning. Each project is weighed to ensure the economic benefits of the project outweigh the costs prior to funding being requested. This helps justify projects to the community and City Council, as well as assisting in prioritizing projects given constrained budgets and providing utility stakeholders with a statistical basis for making an informed decision.

Strategies to provide reliable service are numerous and multi-faceted, and some of those strategies require high capital investments. We support our community's preference of measureable service reliability to set economically justifiable goals for:

- Transmission and distribution facility investments
- Operation projects
- Maintenance projects

This Strategic Planning Plan is paramount in determining the benefits to our community and determining the expenses the utility will incur, as well as effectively communicating both of these outcomes to our stakeholders. Below in **Figure 31** is a Cost/Benefit identification table that pinpoints valuable projects for our community:

($ approximated based off of 2015 Y/E)	Annual Investment/Cost	Annual Revenue Enhancement/Benefit
Resource Adequacy (Reliability)	$13,764,039.62	Wholesale power purchase agreement – most reliable power at the lowest rate available to pass on to our community.
Resource Adequacy (UG Cable)	$300,000.00	Reliability for our customers in areas in which cable has reached life expectancy.
Pole Attachment	$ -	$14,672.50 Revenue/ Public Convenience Benefit
Other Optimization	$1,812,571.95	N. Ftn Substation Upgrades (2 transformer replacements/SF6 Breaker replacement/Engineering/Consultants) Reliability for System Pole Testing/Inspection/Treatment Program / Infrastructure Reliability
Total	**$15,846,611.57**	

Figure 31: Cost/benefit table example of valuable planned projects for our community, what the benefits are and the anticipated expenses/ revenue for each project.

Finally, below in **Figure 32** find the Estimated 5 year Capital Improvement Plan cost.

Estimated 5 Year Capital Improvement Plan	Cost Estimate
115 kV Transmission Line & New Kane Ranch Substation	$21,375,750.00
Improvements	$ 8,605,000.00
Equipment	$164,000.00
Office Facilities	$4,450,000.00
Computer Equipment & Software	$275,000.00
Vehicles	$642,000.00
Total Estimated 5 Year Capital Improvement Plan	**$35,511,750.00**

Figure 32: Estimated 5 Year CIP cost

12. Conclusion

The fundamental purpose of this Strategic Plan is to identify, consider and act on the internal and external issues that are expected to have the greatest influence on the City of Fountain Electric Department's ability to successfully achieve its vision and mission in the future. Upon City Council's approval, we look forward to beginning the implementation phase of this plan to ensure a bright future for our customers.

Updates will be provided to City Council on our progress towards implementing and/or achieving the identified goals in this Plan. As the utility moves forward, this Plan will be used as a guide for future strategic planning.

As we stay in-tune with the evolving electric industry, economic conditions, our customer's needs and expectations, the Plan will be reviewed and updated on a bi-annual basis, in conjunction with our budget process, to reflect the changing needs of our electric system. The strategic issues of today, including financial stability, power supply strategy, system reliability and power quality, technology, high quality workforce, and customer satisfaction may not be the strategic issues of the electric system in the future. It is our intent that this plan be a living document that is modified from time-to-time to remain relevant and useful in managing the electric system's portion of our utility.

The City of Fountain Electric Department has a very long and proud history of serving the electrical needs of the Fountain Valley region. We look forward to the implementation of this Plan for the benefit of our customers.

Appendix A- Data

Table 1: Yearly Historic Peak (MW) 2006-2015

Historic Peak (MW) : 2006-2015

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Jan	34.36	37.41	36.85	34.90	36.41	35.61	35.13	37.37	37.00	38.35
Feb	33.57	36.04	34.54	32.12	34.80	39.65	34.31	34.81	39.37	36.69
March	34.07	33.09	32.19	30.46	32.72	33.90	31.76	34.57	33.89	35.90
April	29.97	31.09	29.46	30.38	28.16	28.33	29.65	32.91	29.74	31.08
May	34.30	28.96	31.12	32.55	34.22	28.14	35.78	32.91	35.59	28.27
June	38.68	41.06	37.82	36.66	41.44	44.05	51.29	50.72	43.15	48.05
July	42.96	43.82	44.44	42.02	44.13	48.58	51.50	50.03	50.35	49.25
August	40.66	45.99	43.01	41.36	44.03	46.38	47.55	50.66	46.16	53.13
September	30.76	39.29	31.91	35.82	39.57	44.13	41.78	49.92	46.53	46.55
October	32.43	31.09	29.52	33.08	31.13	33.87	30.81	31.58	31.39	33.60
November	37.97	35.16	31.76	32.90	35.62	32.46	34.39	36.12	36.04	36.61
December	39.18	38.14	38.78	39.74	36.61	38.29	38.78	40.65	39.57	39.51

Table 2: Historic Energy Usage (KWH x 10^3) 2006-2015

Historic Yearly Energy Usage (KWH x 10^3): 2006-2015

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
KWH Total	218596.290	222380.818	209657.478	205472.885	213409.663	217475.646	220097.388	224146.359	219496.704	226027.271

Table 3: Yearly Peak (MW) Forecast: Aug 2016-2026

Yearly Peak (MW) Forecast: Aug 2016-2026

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Est High	56.817	59.393	62.083	64.891	67.824	70.886	74.083	77.421	80.907	84.545	88.344
Predicted	55.162	57.274	59.466	61.743	64.106	66.560	69.108	71.753	74.500	77.351	80.312
Est Low	53.507	55.155	56.850	58.594	60.388	62.233	64.132	66.085	68.093	70.158	72.281

Table 4: Yearly Energy Usage Forecast (KWH x 10^3): 2016-2026

Yearly Energy Usage Forecast (KWH x 10^3): 2016-2026

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Est High	246941.122	249805.639	252703.385	255634.744	258600.107	261599.868	264634.427	267704.186	270809.555	273950.946	277128.776
Predicted	228649.187	231301.518	233984.616	236698.837	239444.544	242222.100	245031.877	247874.246	250749.588	253658.283	256600.719
Est Low	210357.252	212797.396	215265.846	217762.930	220288.980	222844.332	225429.327	228044.307	230689.621	233365.620	236072.661

Table 5: Historic Monthly Load Factor: 2006-2015

Historic Monthly Load Factor: 2006-2015

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Jan	72.00%	71.75%	71.13%	68.57%	68.22%	71.28%	69.60%	68.86%	70.06%	68.88%
Feb	72.14%	68.53%	71.40%	70.24%	68.67%	61.87%	71.80%	70.16%	63.25%	66.71%
March	70.21%	70.58%	71.44%	72.45%	69.74%	66.49%	69.42%	68.33%	69.61%	65.53%
April	75.47%	75.11%	74.15%	71.54%	76.15%	76.50%	73.21%	70.50%	75.49%	72.60%
May	68.44%	77.81%	68.82%	66.27%	63.66%	76.64%	63.03%	69.76%	63.75%	77.87%
June	68.52%	59.92%	62.08%	62.53%	62.89%	59.92%	56.69%	54.80%	59.72%	56.69%
July	64.93%	65.42%	63.53%	61.58%	63.49%	61.89%	61.98%	57.95%	55.83%	59.70%
August	65.87%	65.21%	59.99%	61.56%	62.87%	64.63%	60.90%	57.98%	59.47%	57.44%
September	74.84%	63.59%	69.78%	63.06%	62.85%	52.92%	57.79%	52.59%	53.93%	59.01%
October	73.06%	74.99%	73.28%	67.98%	70.02%	65.38%	72.04%	71.52%	70.99%	68.72%
November	64.90%	69.17%	71.22%	69.84%	65.27%	72.02%	67.18%	66.93%	69.24%	68.02%
December	68.89%	70.76%	64.82%	66.34%	68.31%	67.74%	66.51%	66.45%	67.21%	68.52%

Appendix B – Recommended Improvements and Cost Estimates by Phase

City of Fountain
Electric Distribution System
2017 - 2026 Long Range Plan
Comprehensive Cost Estimate (2016 $)

	ubstation, Transmission and Critical Equipment Assessment Projects (MAINTENANC	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
1	Overhead Line Upgrades	$ 150,000	$ 150,000	$ 150,000	$ 150,000	$ 200,000	$ 200,000	$ 200,000	$ 200,000	$ 250,000	$ 250,000
2	Underground Line Upgrades	$ 350,000	$ 350,000	$ 400,000	$ 400,000	$ 450,000	$ 450,000	$ 300,000	$ 300,000	$ 300,000	$ 300,000
3	Minor Distribution Line Improvements	$ 300,000	$ 300,000	$ 300,000	$ 350,000	$ 350,000	$ 350,000	$ 300,000	$ 300,000	$ 300,000	$ 300,000
4	System Improvements	$ 150,200	$ 100,000	$ 100,000	$ 150,000	$ 150,000	$ 150,000	$ 150,000	$ 150,000	$ 150,000	$ 150,000
5	Street Light Replacement Program	$ 25,000	$ 25,000	$ 25,000	$ 25,000						
6	New Electric Warehouse	$ 100,000	$ 3,000,000	$ 1,000,000							
7	Computer Equipment & Software	$ 85,000	$ 85,000	$ 85,000	$ 85,000	$ 85,000	$ 85,000	$ 95,000	$ 95,000	$ 95,000	$ 95,000
8	New Building Apparatus		$ 250,000	$ 100,000							
9	Vehicles	$ 480,000	$ 50,000		$ 300,000						
10	Equipment	$ 102,000	$ 130,000								
	ANNUAL MAINTENANCE BUDGET	**$ 1,742,200.00**	**$ 4,440,000.00**	**$ 2,160,000.00**	**$ 1,460,000.00**	**$ 1,235,000.00**	**$ 1,235,000.00**	**$ 1,045,000.00**	**$ 1,045,000.00**	**$ 1,095,000.00**	**$ 1,095,000.00**
	Long Range Plan Improvements	PHASE 1		PHASE 2		PHASE 3		PHASE 4		PHASE 5	
		2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
11	Build 115 kV Transmission Line from North Fountain Sub. to new Kane Ra	$ 100,000	$ 21,275,750								
12	Overhead to Underground Conversion Program					$ 350,000	$ 350,000	$ 350,000	$ 350,000	$ 350,000	$ 350,000
13	Double Circuit Fountain Creek Crossing out of W Ftn Sub to Rice Ln			$ 300,000							
	TOTAL LONG RANGE PLAN IMPROVEMENTS:	**$ 100,000**	**$ 21,275,750**	**$ 300,000**	**$ -**	**$ 350,000**	**$ 350,000**	**$ 350,000**	**$ 350,000**	**$ 350,000**	**$ 350,000**
	BUDGET SUMMARY	PHASE 1			PHASE 2				PHASE 3		
		2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
	2017-2026 ANNUAL MAINTENANCE BUDGET & LONG RANGE PLAN IMPROVEMENTS	$ 1,842,200.00	$ 25,715,750.00	$ 2,460,000.00	$ 1,460,000.00	$ 1,585,000.00	$ 1,585,000.00	$ 1,395,000.00	$ 1,395,000.00	$ 1,445,000.00	$ 1,445,000.00
	GRAND TOTAL 2017-2026 MAINTENANCE & LONG RANGE PLAN	**$40,327,950.00**									

Appendix C – Major O&M Program Details

- **Line Clearance Program**

  The City adheres to line clearance standards set forth by the American National Standards Institute (ANSI Z133.1-latest revision) Pruning, Trimming, Repairing, Maintaining and Removing Trees and Cutting Brush-Safety Requirements for tree pruning, trimming, repairing, or removal. Additional guidelines followed for primary power lines in Fountain is ten feet of clearance either side (except evergreens and fruit trees). Evergreens and fruit trees must be evaluated on an individual basis.

  Ideally, the city removes trees that are deemed to be a hazard located along overhead mainlines entirely to mitigate excessive costs associated with revisiting troubled areas more than once a year on the system. Hazard trees are identified by the following characteristics:

  - Dead/dying
  - Diseased or structurally defective
  - Located outside of the normal trim area, but pose a potential hazard to overhead lines

  This program ensures reliability and safety on our system by reducing the likelihood that vegetation of any type would impact the electric system during extreme weather events and improves the overall performance of the electric system as a whole.

- **Underground Cable Replacement Program**

  The City took additional proactive measures in 2007 to ensure the reliability of the underground portions of our system by completing cable injection operations in conjunction with the underground cable replacement program. This extended the life of the existing direct bury underground cable up to 20 years in areas that expedited underground cable replacement was not warranted, providing time and budgeting for the underground cable replacement program to be implemented throughout the underground portions of our electric service territory.

  Due to the limited amount of information available for the installation dates of each subdivision from the 1960's, planning for cable replacement was based on the following factors:

  - Rate and area of outages due to underground cable failures
  - Age of infrastructure and subdivision build date
  - Maintenance records
  - Diagnostic testing
  - Available options and fiscal responsibility

  Since the 1970's, plastics, PVC, and other materials became more advanced and industry standards implemented the practice of installing underground cable into conduit. This conduit provides protection

from environmental stressors that not only prolong the life of the underground infrastructure, but also provides a safety barrier for excavation operations.

To date, we have completed 9.85 line miles of underground cable replacement, with approximately 16.26 line miles of underground cable replacement to be completed. We anticipate the conclusion of this project to be in 2021; at that time an annual testing and preventative maintenance program will begin.

- **Equipment Maintenance Program**

  Emphasis on maintaining skilled and competent employees, as well as providing training opportunities on the latest technological advances in industry standards contributes greatly to this program through the enhancement of resources available to maintain our system efficiently. When necessary, the city will outsource accordingly when work load demands or technical skill sets exceed the in house resources available.

  This program has enabled the city to avoid extraordinary expenses, reduce power disruptions, and ultimately assist in keeping our rate payer's tariffs reduced; as costly replacement and repair expenses are not passed along to the end user. Additionally, this program is imperative to ascertaining the needs of our system and planning accordingly for future demand.

- **Pole Inspection, Treatment, and Replacement Program**

  The integrity of our overhead distribution system is crucial to the reliability our customers have come to depend upon.

  As our community continued to grow, it became necessary to hire an outside vendor to complete these operations. In 2015, Osmose Utility Services, Inc. completed the inspection of 1,986 poles and identified 224 poles for replacement. Of the 1,986 poles inspected, 1,400 poles required a fumigant treatment and 39 poles required internal treatment.

  It was determined that electric crews would replace poles that were identified for replacement to ensure funding would be available for the continued inspection and treatment process to be completed by the vendor.

  This program will continue with this contractor in 2016 with 2,714 poles to be inspected, treated, cataloged, and identified for replacement.