



Comparative Energy Analysis Report

Prepared for
Santa Ana

Prepared by
The Energy Coalition

On Behalf of

The Southern California Regional Energy Network Public Agency Project Delivery Programs

Date
4/8/2020

Table of Contents

1. Overview	1
2. Total Energy Portfolio	2
3. Water Pumping	3
4. Street & Traffic Lights	4
5. Building Summary	5
6. Outdoor & Park Lights	7
Appendix A - Annual Comparison	8
Appendix B - Methodology	10

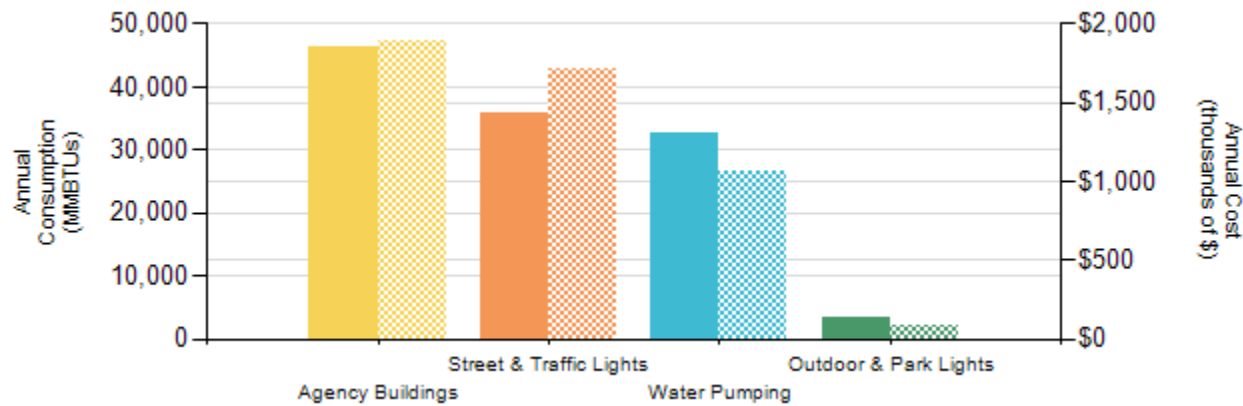
1. Overview

This report is intended to provide a framework for the city of Santa Ana, referred to as “Agency” herein, to identify inefficient facilities and infrastructure and prioritize further investigation and energy efficiency retrofit work. This analysis uses only energy billing data provided by the Agency to analyze energy use across Agency assets, and to help identify opportunities for energy efficiency improvements. Many factors affect the energy use in different assets, including age, type of heating, ventilation, air conditioning (HVAC), and lighting equipment, facility occupancy and hours, plug loads, and climate. Once individual opportunities with the greatest potential for energy savings are identified, a more detailed screening of those facilities can be performed to identify the specific sources of the inefficiencies.

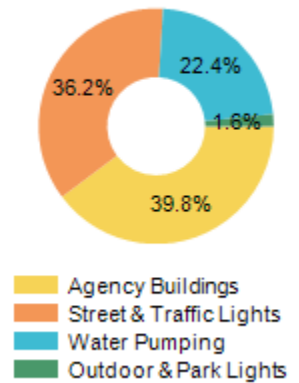
This report was created by The Energy Coalition on behalf of the Southern California Regional Network (www.socalren.org). Any questions about this report can be directed to your assigned Project Manager, Ken Gonzales at kgonzales@energycoalition.org.

2. Total Energy Portfolio

Your Total Annual Energy Cost is **\$4,746,791**



Annual Energy Costs



Key: Solid color represents consumption, hashed color represents cost

Table 1: Total Energy Portfolio (Annual)

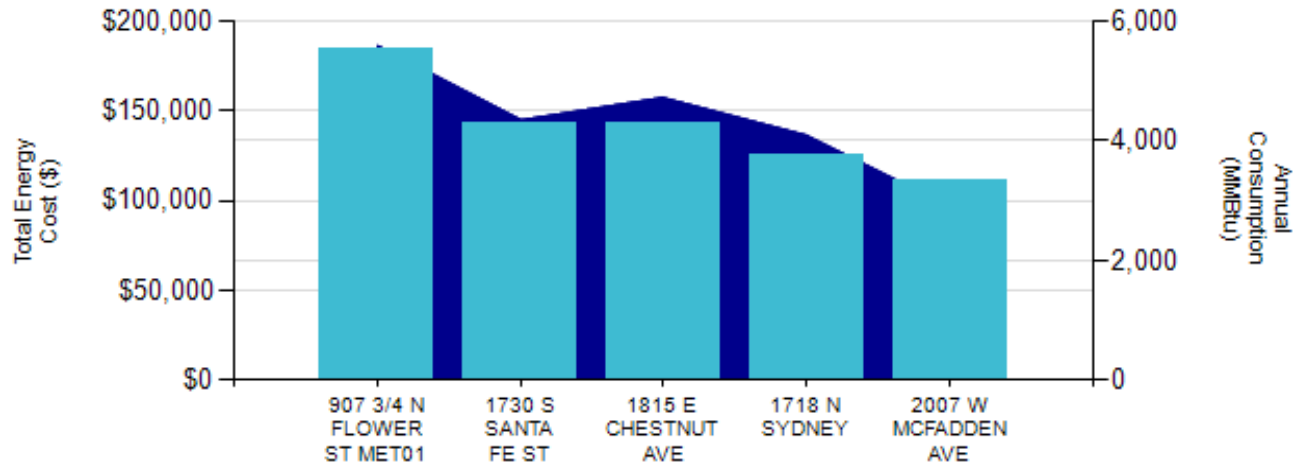
Agency Energy Use	Electric Consumption (kWh)	Electric Cost (\$)	Gas Consumption (therms)	Gas Cost (\$)	Total Energy Consumption (MMBTus)	Total Energy Cost (\$)	GHG Emissions (lbs CO ₂)
Agency Buildings	12,291,413	\$1,854,400	44,761	\$33,692	46,390	\$1,888,093	6,354,660
Street & Traffic Lights	10,485,596	\$1,716,368	0	\$0	35,756	\$1,716,368	5,421,053
Water Pumping	9,529,074	\$1,064,137	0	\$0	32,494	\$1,064,137	4,926,531
Outdoor & Park Lights	1,010,111	\$78,193	0	\$0	3,444	\$78,193	522,227



3. Water Pumping



Your Annual Energy Cost for Water Pumping is **\$1,064,137** and **22.4%** of the Total Cost.



Key: Displays the top 5 consuming pumping service accounts. Columns represent Cost, Area represents Consumption.

Table 2: Water Pumping (Annual)

Site Name	Address	Electric Consumption (kWh)	Electric Cost (\$)	Electric Rate (\$/kWh)
Water Pumping	907 3/4 N FLOWER ST MET01	1,638,901	\$184,213	\$0.11
Water Pumping	1730 S SANTA FE ST	1,274,344	\$143,491	\$0.11
Water Pumping	1815 E CHESTNUT AVE	1,384,491	\$142,741	\$0.10



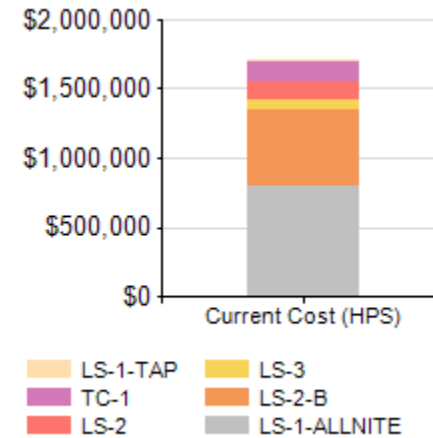
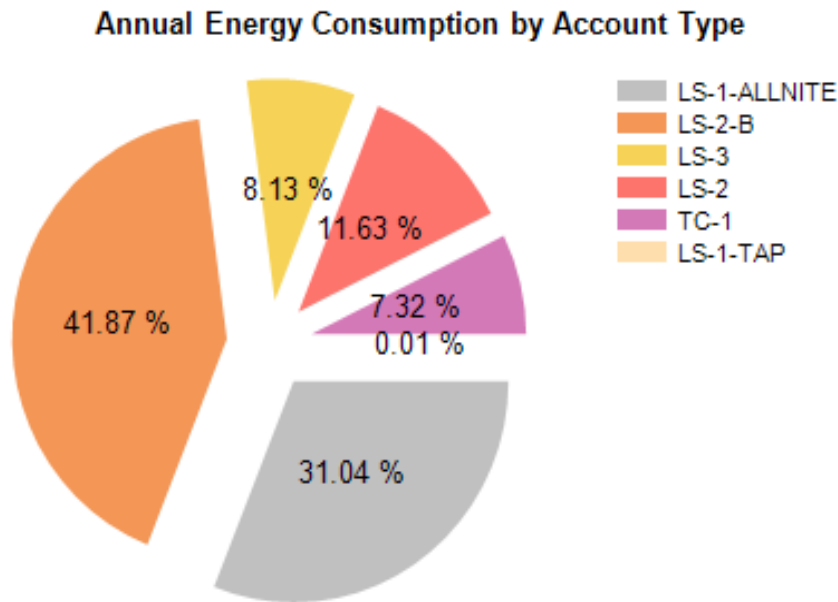
Water Pumping	1718 N SYDNEY	1,200,160	\$125,897	\$0.10
Water Pumping	2007 W MCFADDEN AVE	850,640	\$111,264	\$0.13

Note –Lincus reviewed all city water pumping equipment and stated system was optimal. No further upgrades are needed.



4. Street & Traffic Lights

Your Annual Energy Cost for Street & Traffic Lights is \$1,716,368 and 36.2% of the Total Cost.



Note – Nearly all of the city's streetlights have been upgraded to LED. No further upgrades are needed.
Update – Most LS-1 fixtures have been purchased from SCE.

Table 3: Street & Traffic Lights (Annual)

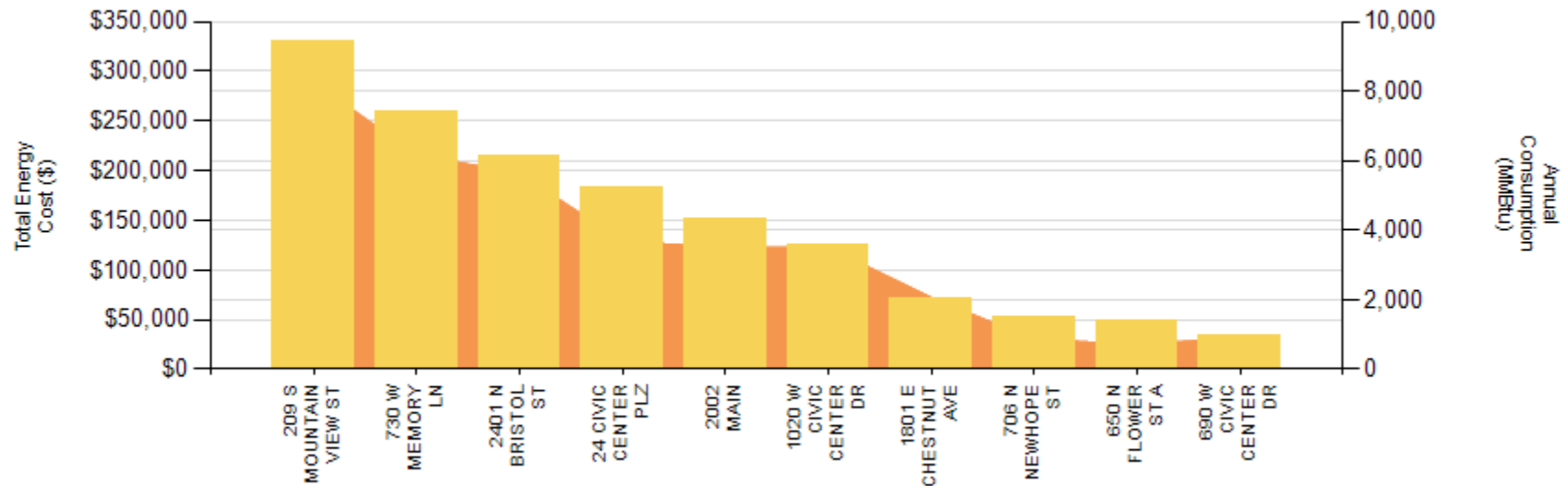
Tariff	Tariff Description	Electric Consumption (kWh)	Electric Cost (\$)	Electric Rate (\$/kWh)
LS-1-ALLNITE	Street Lights (SCE Owned)	3,255,025	\$797,481	0.25
LS-2-B	Street Lights (Agency Owned - unmetered)	4,389,993	\$546,785	0.12
TC-1	Traffic Signal Lights (Agency Owned)	767,495	\$160,911	0.21

LS-2	Street Lights (Agency Owned - unmetered)	1,219,506	\$139,854	0.11
LS-3	Street Lights (Agency Owned - metered)	852,713	\$71,068	0.08
LS-1-TAP	Street Lights (SCE Owned)	864	\$269	0.31

5. Building Summary



Your Annual Energy Cost for Buildings is **\$1,888,093** and **39.8%** of the Total Cost.



Key: Displays the top 10 consuming Buildings. Yellow columns represent Cost, Orange area represents Consumption. Electricity is the solid shade, Natural Gas is the hashed shade.

Table 4: Building Summary (Annual)

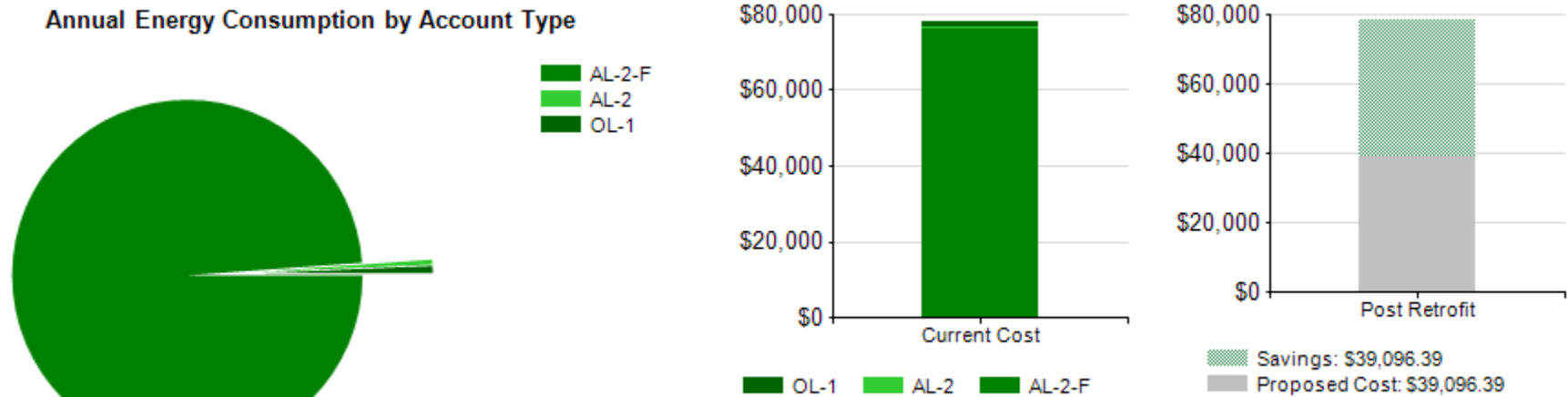
Site Name	Address	Electric Consumption (kWh)	Electric Cost (\$)	Electric Rate (\$/kWh)	Gas Consumption (therms)	Gas Cost (\$)	Gas Rate (\$/therm)	Disadvantaged Community (Yes or No)
WEST PS & WELLS 20, 21, 30	209 S MOUNTAIN VIEW ST	2,422,338	\$330,407	\$0.14	0	\$0	\$0.00	Yes
PUMP	730 W MEMORY LN	1,809,194	\$260,162	\$0.14	0	\$0	\$0.00	No
PUMPING STATION-GARTHE (& SA)	2401 N BRISTOL ST	1,653,083	\$214,901	\$0.13	0	\$0	\$0.00	No
CIVIC CENTER	24 CIVIC CENTER PLZ	1,079,454	\$182,954	\$0.17	0	\$0	\$0.00	Yes
BOWERS MUSEUM	2002 MAIN	1,026,463	\$151,506	\$0.15	0	\$0	\$0.00	No
STADIUM PARKING STRUCTURE	1020 W CIVIC CENTER DR	1,026,595	\$125,142	\$0.12	0	\$0	\$0.00	Yes
SANTA ANA ZOO	1801 E CHESTNUT AVE	603,193	\$72,346	\$0.12	0	\$0	\$0.00	Yes
SALGADO COMMUNITY CENTER/ROSITA PARK	706 N NEWHOPE ST	252,198	\$53,189	\$0.21	0	\$0	\$0.00	Yes
SANTA ANA STADIUM	650 N FLOWER ST A	209,572	\$48,663	\$0.23	0	\$0	\$0.00	Yes

COURTHOUSE/LIBRARY PARKING STRUCTURE	690 W CIVIC CENTER DR	264,150	\$33,864	\$0.13	0	\$0	\$0.00	Yes
JEROME CENTER	722 S CENTER ST	232,045	\$35,444.37	\$0.15	0	\$0	\$0.00	Yes
MEMORIAL PARK	2102 S FLOWER ST	176,929	\$25,724.19	\$0.15	0	\$0	\$0.00	Yes
ASIAN AMERICAN SENIOR CITIZEN CENTER	424 W 3 RD ST	145,553	\$24,451.40	\$0.17	0	\$0	\$0.00	Yes
MCFADDEN LIBRARY/POLICE ATHLETIC LEAGUE	2627 W MCFADDEN	94,169	\$24,084.78	\$0.26	0	\$0	\$0.00	Yes
CARL THORTON PARK	1801 W SEGERSTROM	44,458	\$20,529.41	\$0.46	0	\$0	\$0.00	Yes

6. Outdoor & Park Lights



Your Annual Energy Cost for Outdoor & Park Lights is **\$78,193** and **1.6%** of the Total Cost.



Assumption -agencies can save 50% on annual outdoor & park light kWh consumption by converting HPS to LED.

Calculation – projected savings are 50% of the total kWh consumption of outdoor & park lights.

Table 5: Outdoor & Park Lights (Annual)

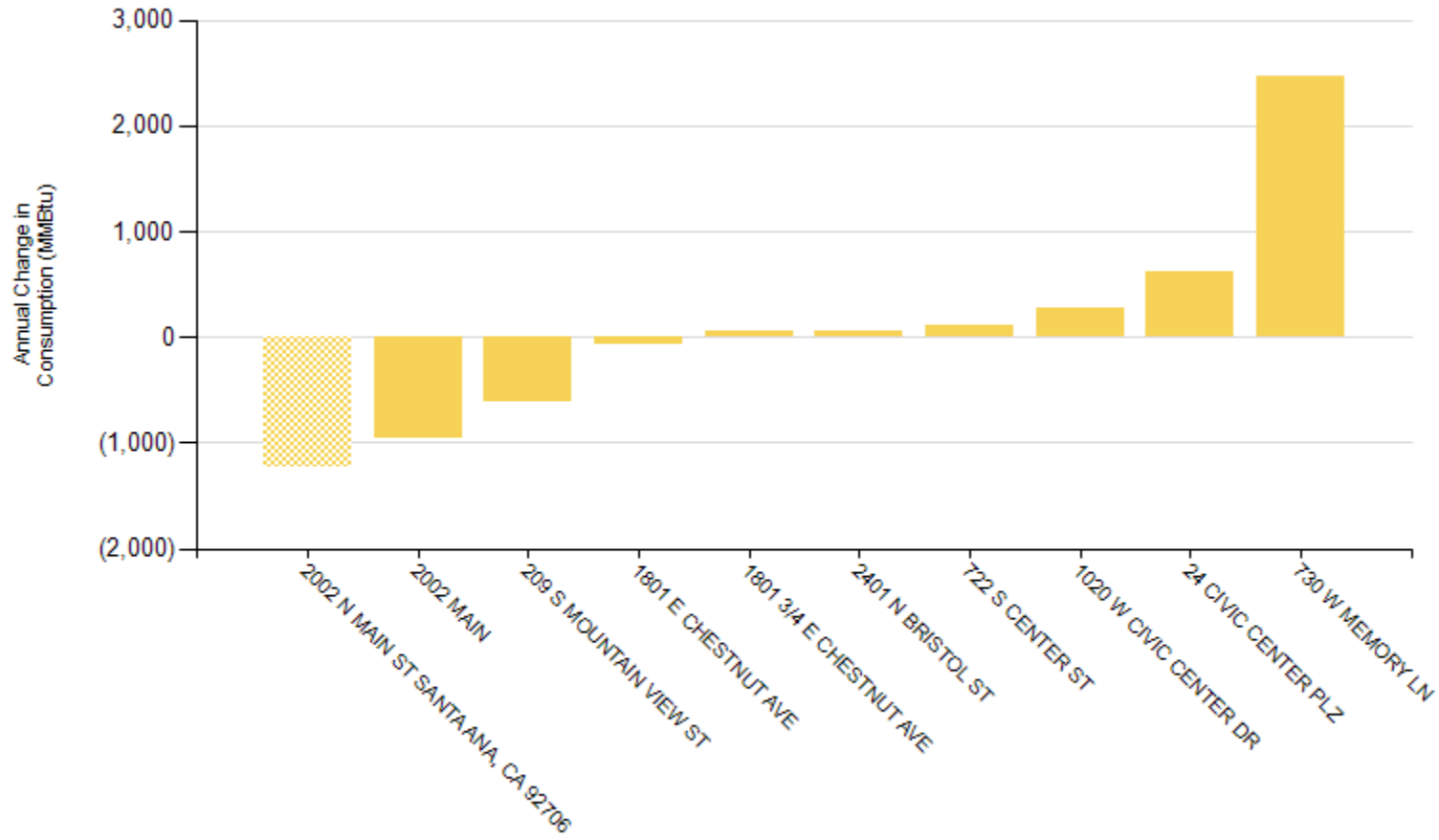
Name	Address	Tariff	Electric Consumption (kWh)	Electric Cost (\$)	Electric Rate (\$/kWh)
Area Lighting	Various	AL-2-F	998,571	\$76,168	\$0.08
Area Lighting	Various	OL-1	6,804	\$1,645	\$0.24



Area Lighting	Various	AL-2	4,736	\$379	\$0.08
---------------	---------	------	-------	-------	--------



Appendix A - Annual Comparison



Key: Displays Buildings with the top 10 absolute change in MMBtu from baseline period to analysis period. Electricity is the solid yellow shade, Natural Gas is the hashed yellow shade.

Table 6: Annual Comparison

Site Name	Address	Prior Year Electric Consumption (kWh)	Current Year Electric Consumption (kWh)	Annual Change in Electricity	Prior Year Gas Consumption (therms)	Current Year Gas Consumption (therms)	Annual Change in Gas
BOWERS MUSEUM	2002 N MAIN ST SANTA ANA, CA 92706	1,463,529	1,179,463	-19.4%	37,199	26,825	-27.9%
WEST PS & WELLS 20, 21, 30	209 S MOUNTAIN VIEW ST	2,914,194	2,728,680	-6.4%	-	-	0.0%
SANTA ANA ZOO	1801 E CHESTNUT AVE	581,675	589,663	1.4%	-	-	0.0%
UNKNOWN (Zoo)	1801 3/4 E CHESTNUT AVE	100,177	115,874	15.7%	-	-	0.0%
PUMPING STATION – GARTHE (& SA)	2401 N BRISTOL ST	1,538,533	1,745,410	13.4%	-	-	0.0%
JEROME CENTER	722 S CENTER ST	223,234	232,045	3.9%	-	-	0.0%
STADIUM PARKING STRUCTURE	1020 W CIVIC CENTER DR	1,008,332	1,063,150	5.4%	-	-	0.0%
CIVIC CENTER	24 CIVIC CENTER PLZ	1,139,966	1,199,818	5.3%	-	-	0.0%
PUMP	730 W MEMORY LN	1,328,385	1,928,426	45.2%	-	-	0.0%

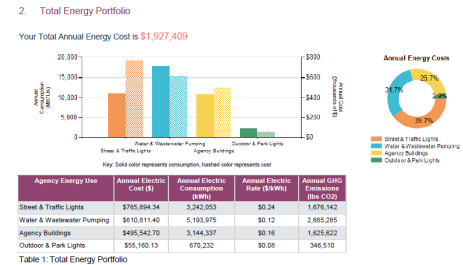
Appendix B - Methodology

1. Data Sources

- Building information, energy usage and cost data used in this analysis were derived from utility consumption billing data provided by agency staff.
- Utility consumption billing data used in this analysis were derived from SCG gas tariffs and SCE electric tariffs
- For more information about the utility tariffs included in this analysis refer to:
 - SCG Gas Tariffs: [For more information about Southern California Gas tariffs;](https://www.socalgas.com/regulatory/tariffs/tariffs-rates.shtml)
<https://www.socalgas.com/regulatory/tariffs/tariffs-rates.shtml>
 - SCE Electric Tariff: [For more information about Southern California Edison tariffs;](https://www.sce.com/wps/portal/home/regulatory/tariff-books/rates-pricing-choices)
<https://www.sce.com/wps/portal/home/regulatory/tariff-books/rates-pricing-choices>
- Analysis period for electricity were based on usage during period October 1, 2018 – September 30, 2019.
- In some cases, multiple meters were associated with a single facility or asset type. For such facilities, to generate estimates of facility-wide energy use, energy usage and cost values were aggregated by summing energy usage and cost values for each day in the analysis period.
- GHG emissions data used in this analysis were calculated using the conversion: 517 lb CO₂/MWh + 11.91 lbs CO₂/therm [1,2].

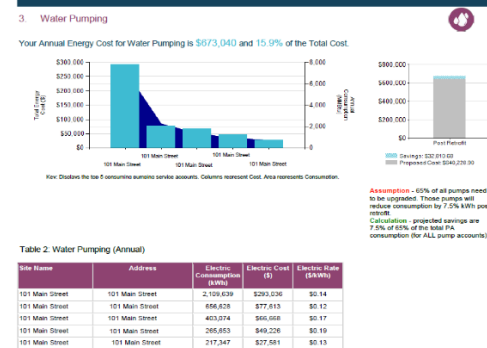
2. Total Energy Portfolio

- Total Energy Portfolio data represents an analysis of each agency facility type annual energy costs, annual energy consumption (kWh and therms), GHG Emissions and total annual energy costs for agency facility types based on MMBtus.
- Total energy consumption and energy cost shown, does not include Police Department, City Hall, Ross Annex, Corp Yard, and Santa Ana Regional Transportation Center
- Actual energy consumption is 43,659,791 kWh and actual bill amount is \$6,195,613
- The following agency assets are included in the Total Energy Portfolio:
 - Water Pumping
 - Street & Traffic Lights
 - Buildings
 - Outdoor & Parks Lights



3. Water Pumping

- Water pumping data represents an analysis of the top five highest energy consuming water and wastewater pumping SCE and SCG service accounts annual energy costs, annual energy consumption (kWh and therms) and total annual energy costs.
- Water pump conversion data used in this analysis is derived on the assumption that 65% of all existing pumps need to be upgraded. Of the 65% of pumps requiring upgrades, it is assumed that the pumps will save 7.5% of their annual kWh consumption [3].
- Comment in this page was provided by TRC



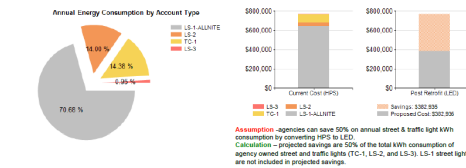


4. Street & Traffic Lights

- Street & traffic light data represents an analysis of annual energy costs and annual energy consumption (kWh) per SCE street & traffic light tariff type.
- Annual cost savings reflects only agency owned street lights in the analysis; assumed cost savings conversion is based on converting HPS to LED agency owned traffic and street lights [3].
- On average, agencies can save 50% on annual kWh consumption by converting HPS to LED, which also results in cost savings [3].
- Comments in this page were provided by TRC

4. Street & Traffic Lights

Your Annual Energy Cost for Street & Traffic Lights is \$765,894 and 39.7% of the Total Cost.



Light Type	Light Description	Annual Electric Consumption (kWh)	Annual Electric Cost (\$)
LS-1-ALLNITE	Street Lights (SCE Owned)	2,399,241	\$641,874
TC-1	Traffic Lights (Agency Owned)	465,084	\$61,733
LS-2	Street Lights (Agency Owned)	453,399	\$39,446
LS-3	Street Lights (Agency Owned)	30,652	\$3,023

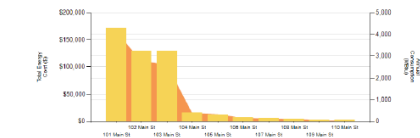
Table 3: Street & Traffic Lights

5. Building Summary

- Building summary data is weather normalized and includes the following metrics for the top ten highest energy-consuming agency buildings' (total annual energy costs): annual energy costs and annual energy consumption (kWh and therms).

5. Building Summary

Your Annual Energy Cost for Buildings is \$452,495 and 25.7% of the Total Cost.



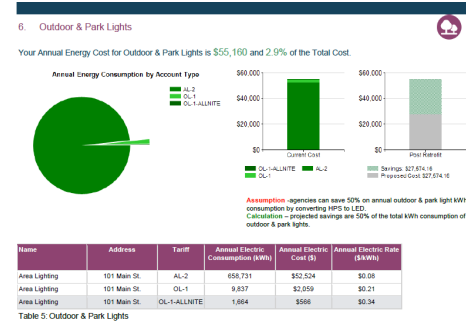
File: Choose the top 10 consuming buildings. Column: Annual Cost. Area: Annual Consumption.

Name	Address	Annual Electric Consumption (kWh)	Annual Electric Cost (\$)	Annual Electric Rate (\$/kWh)
101 Main St	101 Main St	1,200,000	\$172,200	\$0.14
102 Main St	102 Main St	801,408	\$120,106	\$0.16
103 Main St	103 Main St	791,790	\$120,046	\$0.17
104 Main St	104 Main St	105,182	\$16,040	\$0.15
105 Main St	105 Main St	92,182	\$12,708	\$0.14
106 Main St	106 Main St	44,372	\$7,419	\$0.17
107 Main St	107 Main St	32,022	\$5,838	\$0.18
108 Main St	108 Main St	26,504	\$4,262	\$0.16
109 Main St	109 Main St	12,983	\$2,354	\$0.19
110 Main St	110 Main St	10,834	\$1,912	\$0.18

Table 4: Building Summary

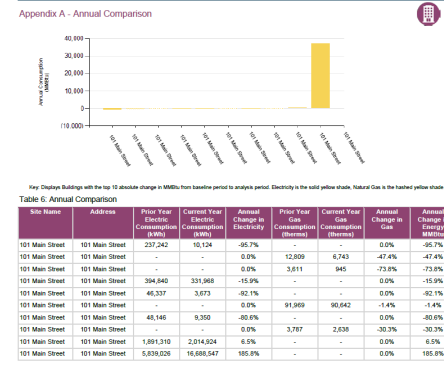
6. Outdoor & Park Lights

- Outdoor & park lights data represents an analysis of annual energy costs, annual energy consumption (kWh) and total annual energy costs per SCE outdoor and park lighting tariff type.



Appendix A - Annual Comparison

- Annual comparison data includes the following metrics for the agency buildings with the greatest change (absolute value) in annual energy consumption (MMBtu) from baseline period to analysis period: annual energy costs, annual energy consumption (kWh and therms).
- Baseline period for electricity results were based on usage during October 1, 2017 – September 30, 2018.
- Analysis period for electricity results were based on usage during October 1, 2018 – September 30, 2019.
- Numerical values were added manually and thus, come directly from utility billing data





Endnotes

[1] Corporate Responsibility Report. (2015). In Southern California Edison. Retrieved from https://www.sce.com/wps/wcm/connect/c0fceed5-e04a-4287-8301-8e66e3e5fbac/2014_Corporate+Responsibility+Report_FINAL+single-page.pdf?MOD=AJPERES&ContentCache=NONE

[2] Adams, L.S., Nicols, M.D., Goldstene, J. N. (2008). Climate Change Scoping Plan. In California Air Resources Board. Retrieved from https://www.arb.ca.gov/cc/scopingplan/document/appendices_volume2.pdf

[3] Based on SoCalREN previous project estimates.
