



Comparative Energy Analysis Report

Comparative Energy Analysis

Prepared for

City of Rancho Cucamonga

Prepared by

The Energy Network

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1. Overview

This report is intended to provide a framework for the City of Rancho Cucamonga, referred to as “City” herein, to identify inefficient facilities and prioritize further investigation and energy efficiency retrofit work. This analysis uses only total floor area and energy billing data provided by the City to provide an overview of energy use in City facilities and to help identify individual locations with the potential for energy efficiency improvements. Many factors affect the energy use in different facilities, including age, type of heating, ventilation, air conditioning, and lighting equipment, facility occupancy and hours, plug loads, and climate. Once individual facilities 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. Further analysis can identify inefficient equipment, malfunctioning equipment, equipment not operating as designed, or suboptimal operational procedures.

2. City of Rancho Cucamonga Facilities Summary

As identified in **Table 2.1**, this report presents an analysis of energy consumption data for 21 facilities over the period October 2014 to September 2015. Within this portfolio of the City’s properties, electricity data is available for 16 facilities and gas data is available for 15 facilities. For five facilities, no electric data was available; and for six others, no gas data was available. Based on the available data, the annual energy cost for these 21 facilities is approximately \$1.88 million. Based on facilities with available utility data, the average electricity cost is \$0.15/kWh and the average gas cost is \$0.94/therm.

The facilities in City’s portfolio that were analyzed in this CEA contain over 499,000 ft² of floor area. The facility sizes range from 867 ft² to 140,000 ft² of floor area. In the figures presented in section 3 of this report, annual energy consumption and costs are normalized to square footage in buildings where floor area data are available. Annual energy usage or cost values that have been normalized for floor area are called “intensity” values. Since the facilities included in the City’s portfolio represent a variety of building types and space uses, it may not be feasible or desirable to normalize the energy usage or cost intensity across all facilities. **Figure 2.1** shows the highest, lowest, and median energy cost intensities of the facilities within the City’s portfolio analyzed for this CEA.

Additional details on the analysis methodology are presented in section 4.

Table 2.1 – Total Energy Cost Summary – City of Rancho Cucamonga – October, 2014 - September, 2015 (Sorted by Total Annual Energy Cost)

Facility Name	Peak Demand (kW)	Total Annual Electricity Use (kWh/yr)	Total Annual Electricity Cost (\$/yr)	Average Electricity Rate (\$/kWh)	Total Annual Gas Use (Therm/Yr)	Total Annual Gas Cost (\$/yr)	Average Gas Rate (\$/Therm)	Total Annual Energy Cost (\$/Yr)	Total Annual Energy Cost Intensity (\$/ft2/yr)
Civic Center (City Hall & PD)	1,023	3,669,460	\$ 463,514	\$ 0.13	17,449	\$ 13,349	\$ 0.77	\$ 476,863	\$ 3.41
VG Cultural Center	526	1,841,589	\$ 265,841	\$ 0.14	20,542	\$ 15,634	\$ 0.76	\$ 281,475	\$ 4.20
Epicenter/Sports Complex (Includes Maintenance Bldg)	865	1,260,917	\$ 261,426	\$ 0.21	9,863	\$ 7,940	\$ 0.81	\$ 269,366	\$ 16.65
Central Park Community Center	432	1,555,082	\$ 244,651	\$ 0.16	28,488	\$ 21,269	\$ 0.75	\$ 265,920	\$ 4.67
Animal Center	244	689,361	\$ 93,840	\$ 0.14	17,461	\$ 13,449	\$ 0.77	\$ 107,289	\$ 7.84
VG Mall Electrical Substation	-	-	\$ 86,546	\$ -	-	\$ -	\$ -	\$ 86,546	\$ 72.12
Red Hill Park (Area Lighting)	336	266,295	\$ 84,626	\$ 0.32	-	\$ -	\$ -	\$ 84,626	\$ 23.41
Archibald Library	131	445,630	\$ 68,036	\$ 0.15	-	\$ -	\$ -	\$ 68,036	\$ 2.67
Family Sports Center	125	397,030	\$ 63,393	\$ 0.16	-	\$ -	\$ -	\$ 63,393	\$ 1.86
Lions Center East	94	332,698	\$ 52,423	\$ 0.16	2,893	\$ 2,851	\$ 0.99	\$ 55,274	\$ 4.61
Fire Station #174	76	267,362	\$ 36,339	\$ 0.14	3,006	\$ 2,804	\$ 0.93	\$ 39,143	\$ 2.04
RC Family Resource Center	59	135,762	\$ 26,883	\$ 0.20	920	\$ 1,070	\$ 1.16	\$ 27,952	\$ 2.70
Corporate Yard	-	-	\$ -	\$ -	37,914	\$ 19,465	\$ 0.51	\$ 19,465	\$ 0.47
VG Police Station	25	81,594	\$ 12,690	\$ 0.16	-	\$ -	\$ -	\$ 12,690	\$ 3.63
Heritage Park Maintenance (Area Lighting)	-	141,269	\$ 11,045	\$ 0.08	-	\$ -	\$ -	\$ 11,045	\$ 12.74
Heritage Park Equestrian Center (Area Lighting)	-	23,187	\$ 2,018	\$ 0.09	-	\$ -	\$ -	\$ 2,018	\$ 0.66
Lions Center West	-	11,038	\$ 1,001	\$ 0.09	861	\$ 972	\$ 1.13	\$ 1,974	\$ 0.19
Fire Station #172	-	-	\$ -	\$ -	1,220	\$ 1,293	\$ 1.06	\$ 1,293	\$ 0.20
Fire Station #177	-	-	\$ -	\$ -	1,005	\$ 1,159	\$ 1.15	\$ 1,159	\$ 0.14
Fire Station #175	-	-	\$ -	\$ -	843	\$ 988	\$ 1.17	\$ 988	\$ 0.05
Fire Station #171	-	-	\$ -	\$ -	731	\$ 891	\$ 1.22	\$ 891	\$ 0.12
Total		11,118,274	\$ 1,774,272		143,196	\$ 103,134		\$ 1,877,406	
% of Total Energy Costs			95%			5%		100%	



Figure 2.1 – Annual Energy Costs and Cost Intensities for City of Rancho Cucamonga Facilities*

\$/ft ²	\$ 23.41	City of Rancho Cucamonga Highest Cost Intensity Red Hill Park (Area Lighting)	\$ 84,625.76	\$/Facility
	\$ 2.70	City of Rancho Cucamonga Median Cost Intensity RC Family Resource Center	\$ 27,952.37	
	\$ 0.19	City of Rancho Cucamonga Lowest Cost Intensity Lions Center West	\$ 1,973.59	

* Excludes VG Mall Electric Substation and facilities that do not contain both electric and gas data. Please see section 4 for additional details.

3. Annual Energy Costs and Usage in City of Rancho Cucamonga Facilities

Figures 3.1 – 3.10 provide graphical comparisons among the City’s facilities of their energy use, and cost, and their intensity, or use/cost per square foot. Each figure shows a different set of data as described below:

- Figure 3.1: Ten Facilities with Highest Annual Electric Energy Use (MWh)
- Figure 3.2: Ten Facilities with Highest Annual Electric Energy Use Intensity (kWh/ft²)
- Figure 3.3: Ten Facilities with Highest Annual Electricity Cost across All Facilities (\$)
- Figure 3.4: Ten Facilities with Highest Annual Electricity Cost Intensity (\$/ft²)
- Figure 3.5: Ten Facilities with Highest Annual Natural Gas Energy Use (Therms)
- Figure 3.6: Ten Facilities with Highest Annual Natural Gas Use Intensity (Therms/ft²)
- Figure 3.7: Ten Facilities with Highest Annual Natural Gas Cost (\$)
- Figure 3.8: Ten Facilities with Highest Annual Natural Gas Cost Intensity (\$/ft²)
- Figure 3.9: Ten Facilities with Highest Combined Annual Energy Cost (\$)
- Figure 3.10: Ten Facilities with Highest Combined Annual Energy Cost Intensity (\$/ft²)

Figure 3.1 – Ten Facilities with Highest Annual Electric Energy Use (MWh)

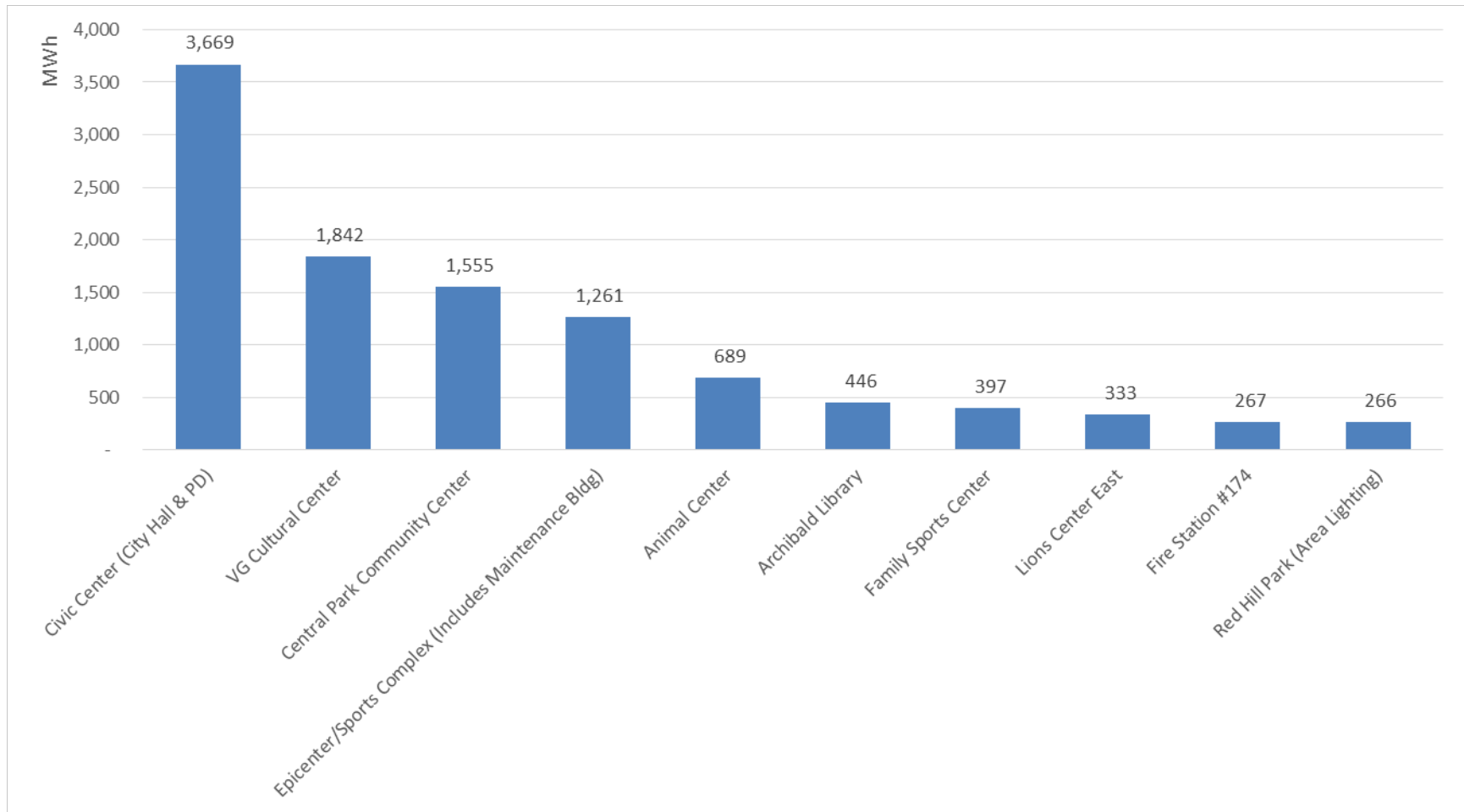


Figure 3.2 – Ten Facilities with Highest Annual Electric Energy Use Intensity (kWh/ft²)

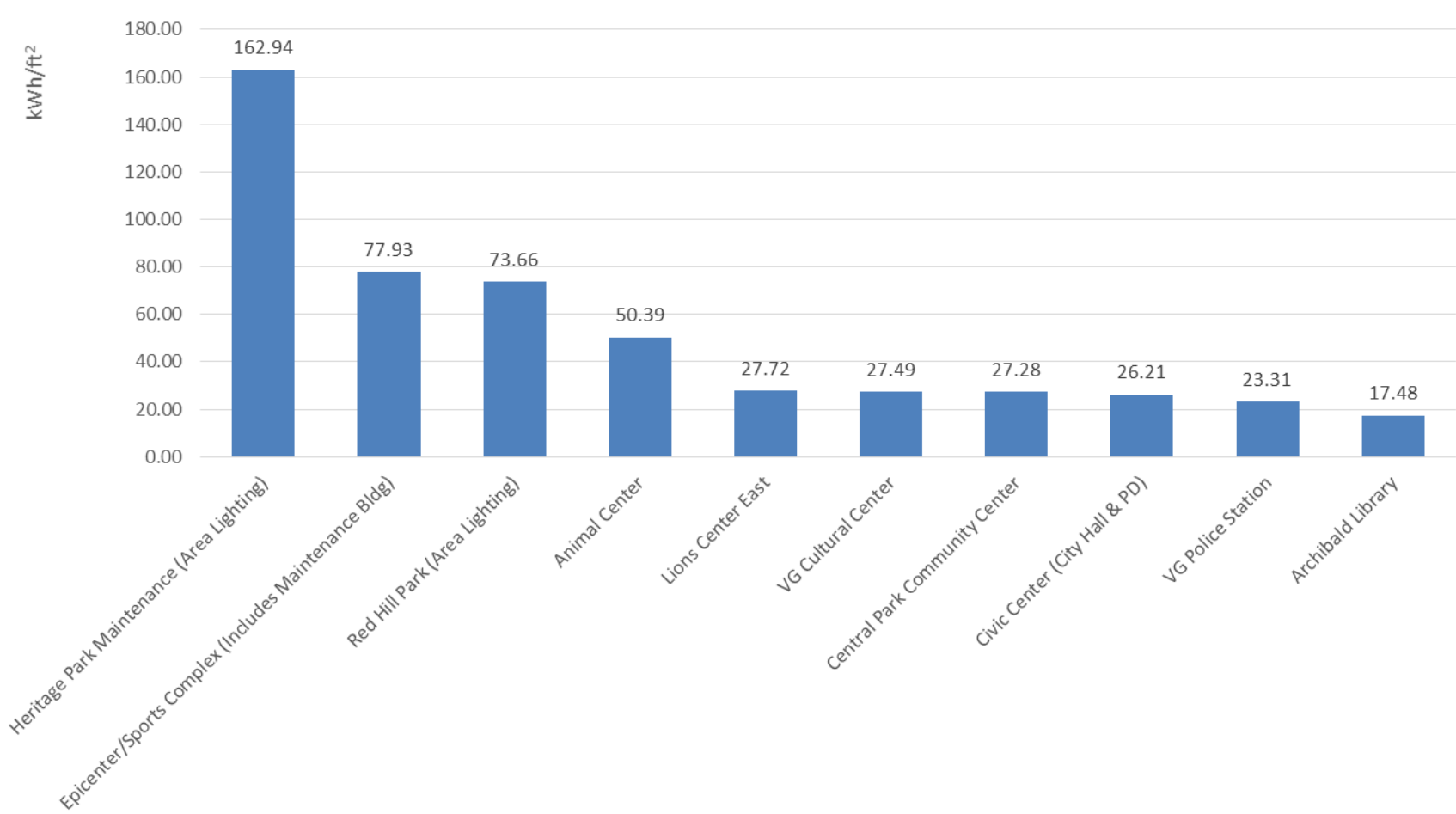


Figure 3.3 – Ten Facilities with Highest Annual Electricity Cost across All Facilities (Thousands \$)

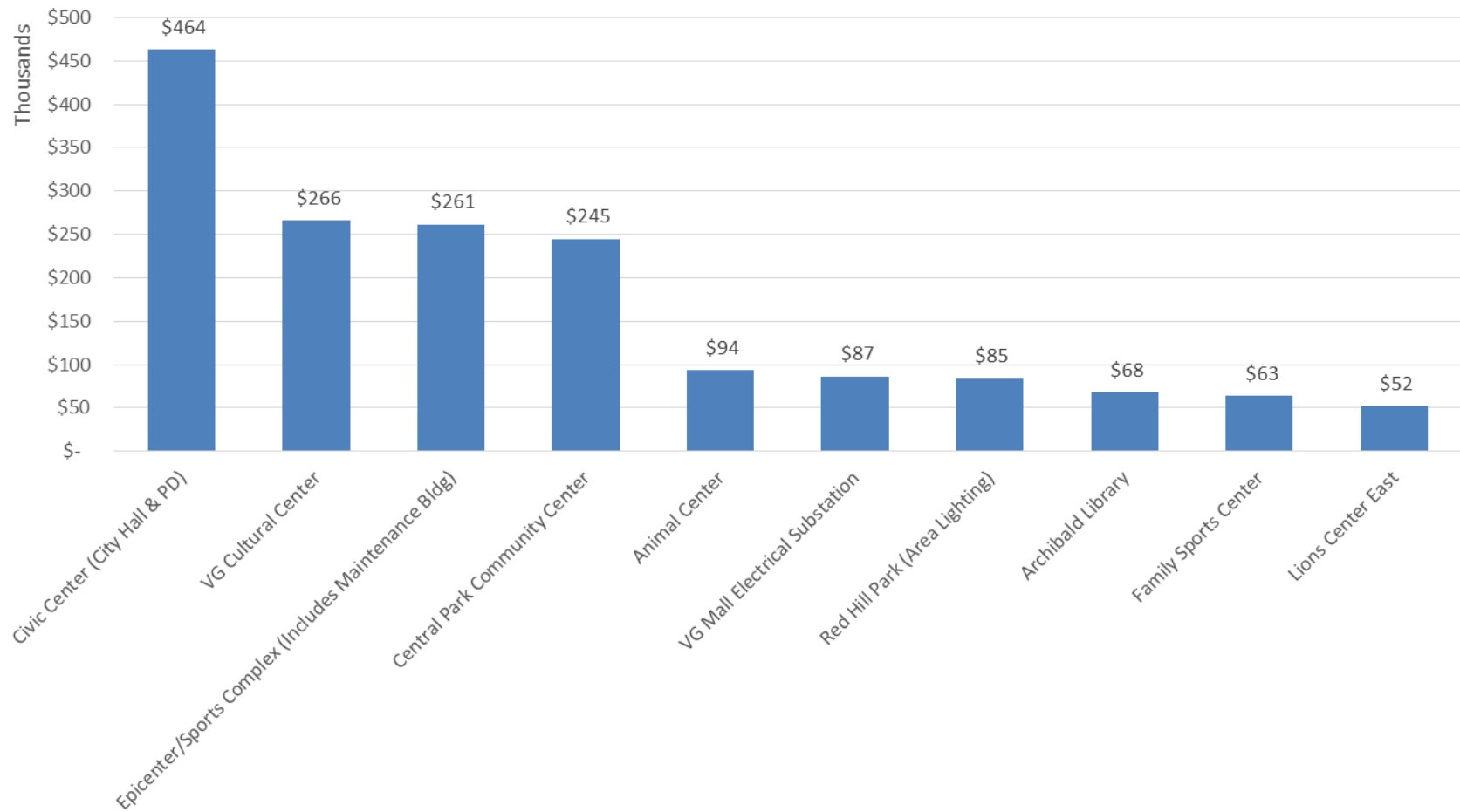


Figure 3.4 – Ten Facilities with Highest Annual Electricity Cost Intensity (\$/ft²)

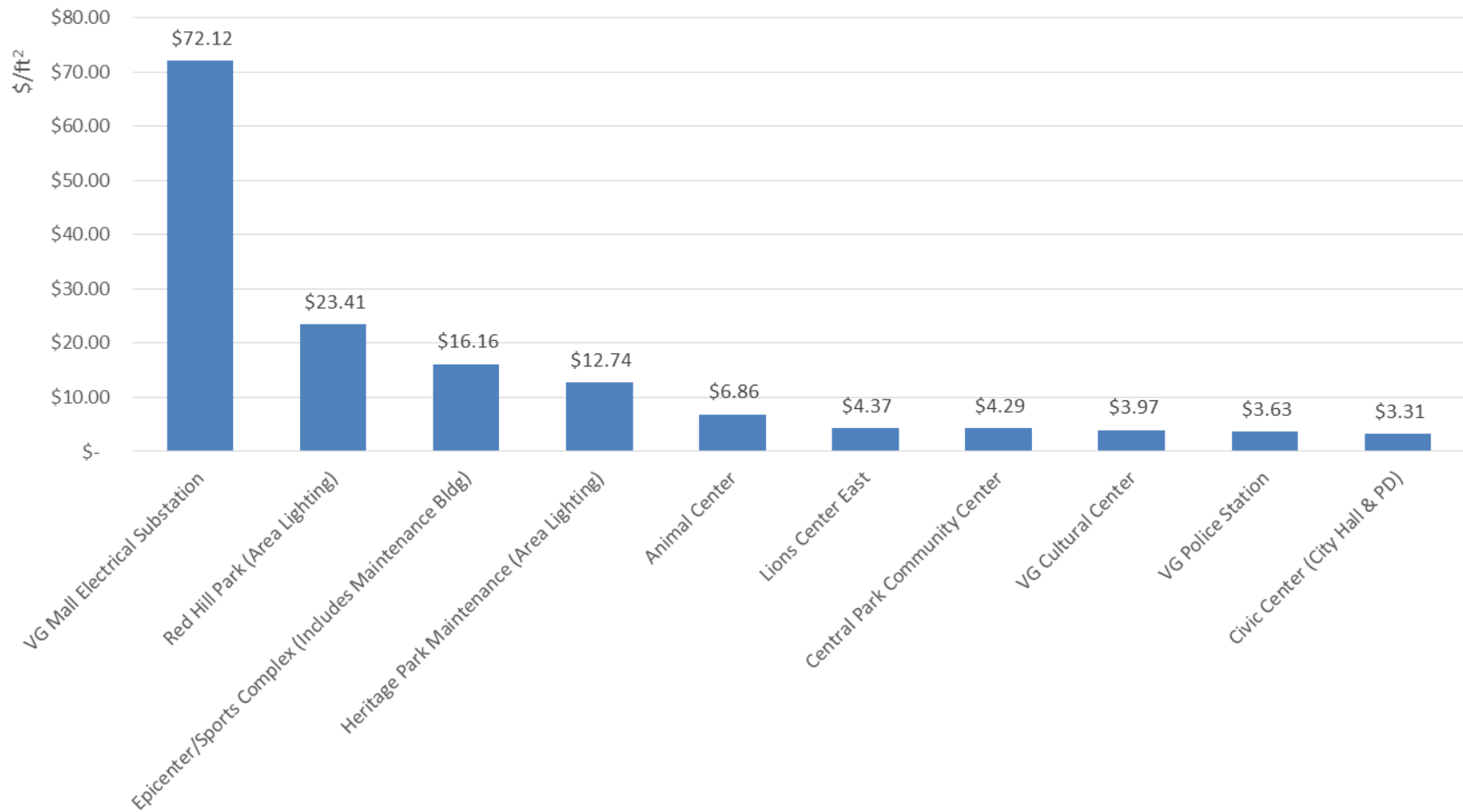


Figure 3.5 – Ten Facilities with Highest Annual Natural Gas Energy Use (Therms)

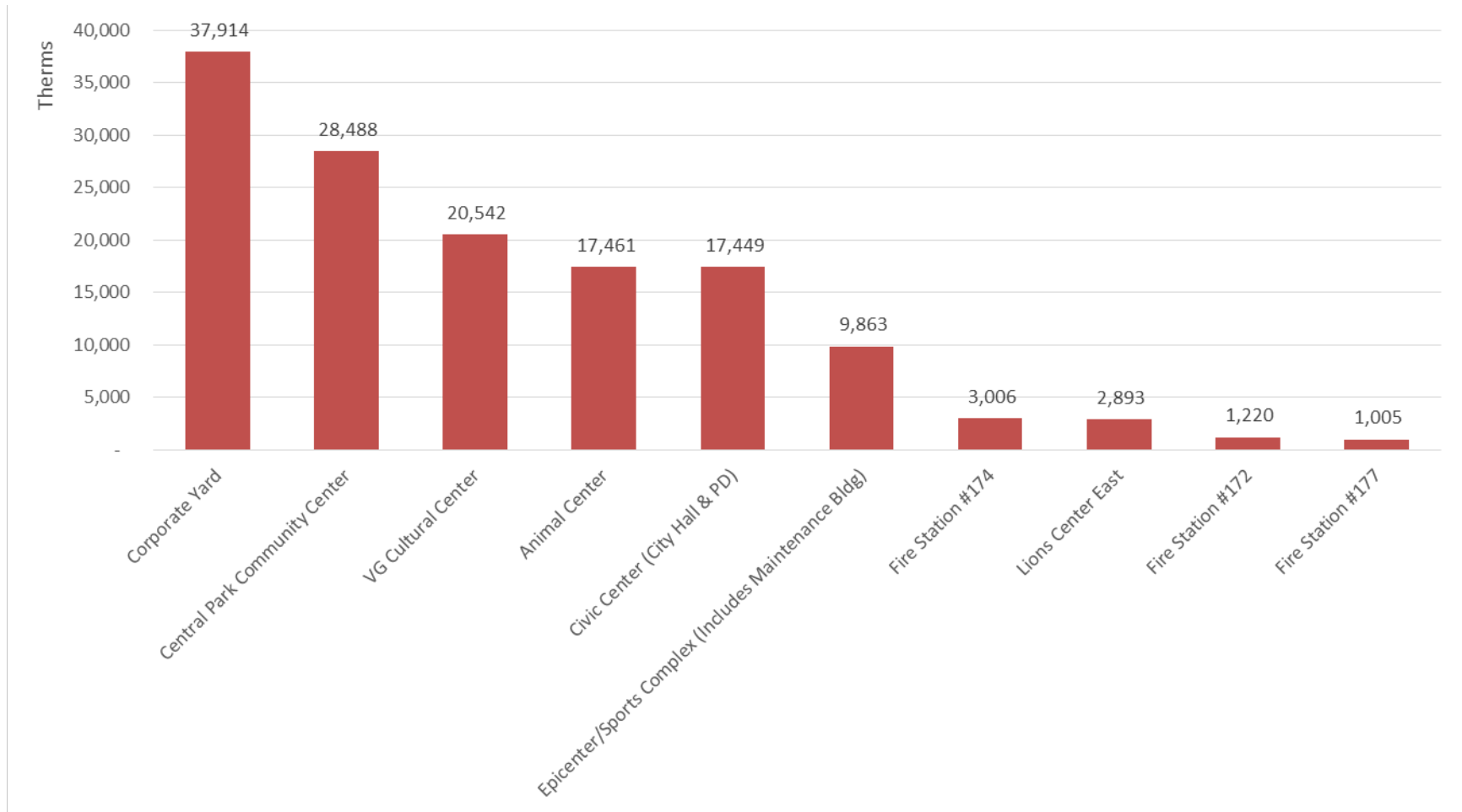


Figure 3.6 – Ten Facilities with Highest Annual Natural Gas Use Intensity (Therms/ft²)

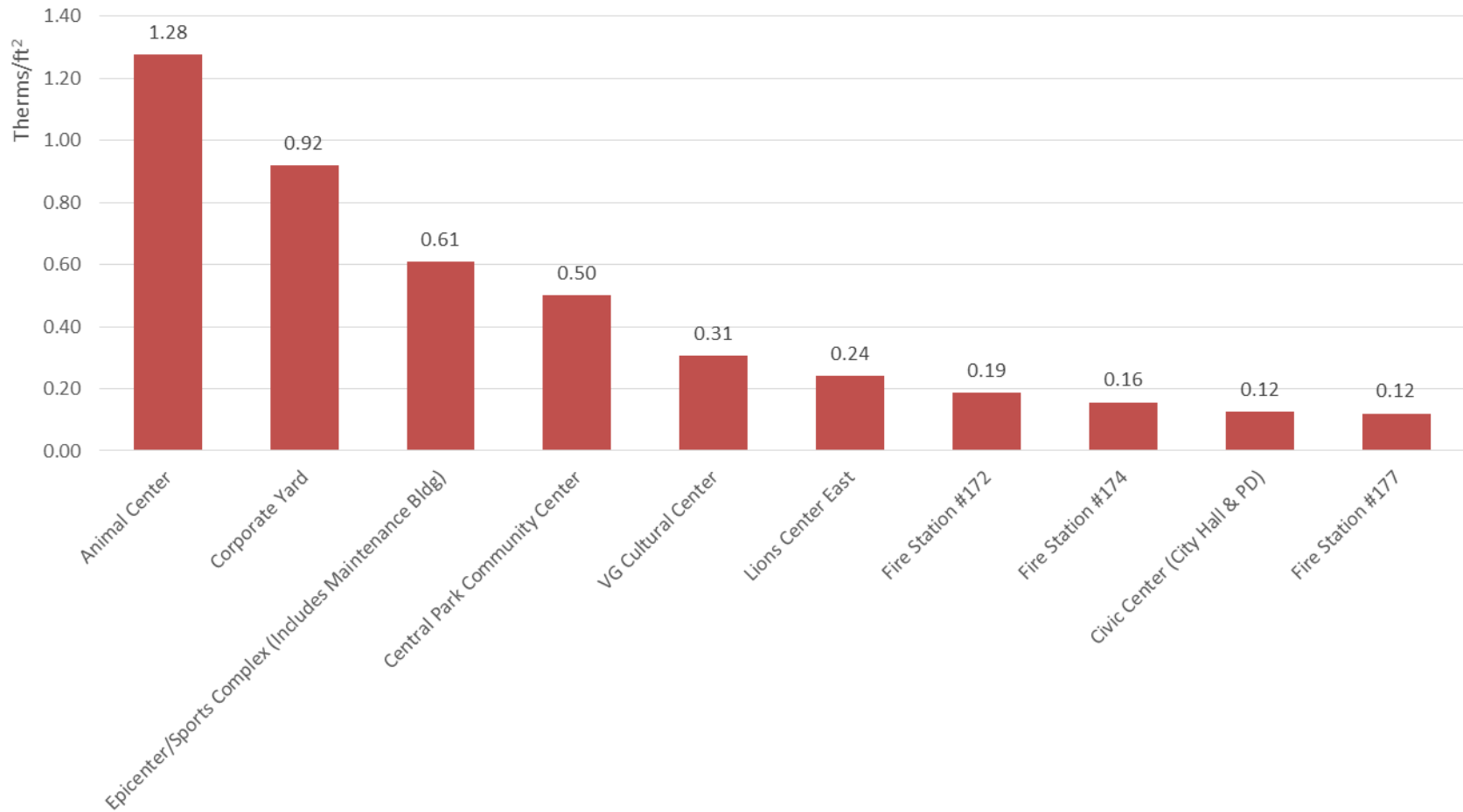


Figure 3.7 – Ten Facilities with Highest Annual Natural Gas Cost (\$)

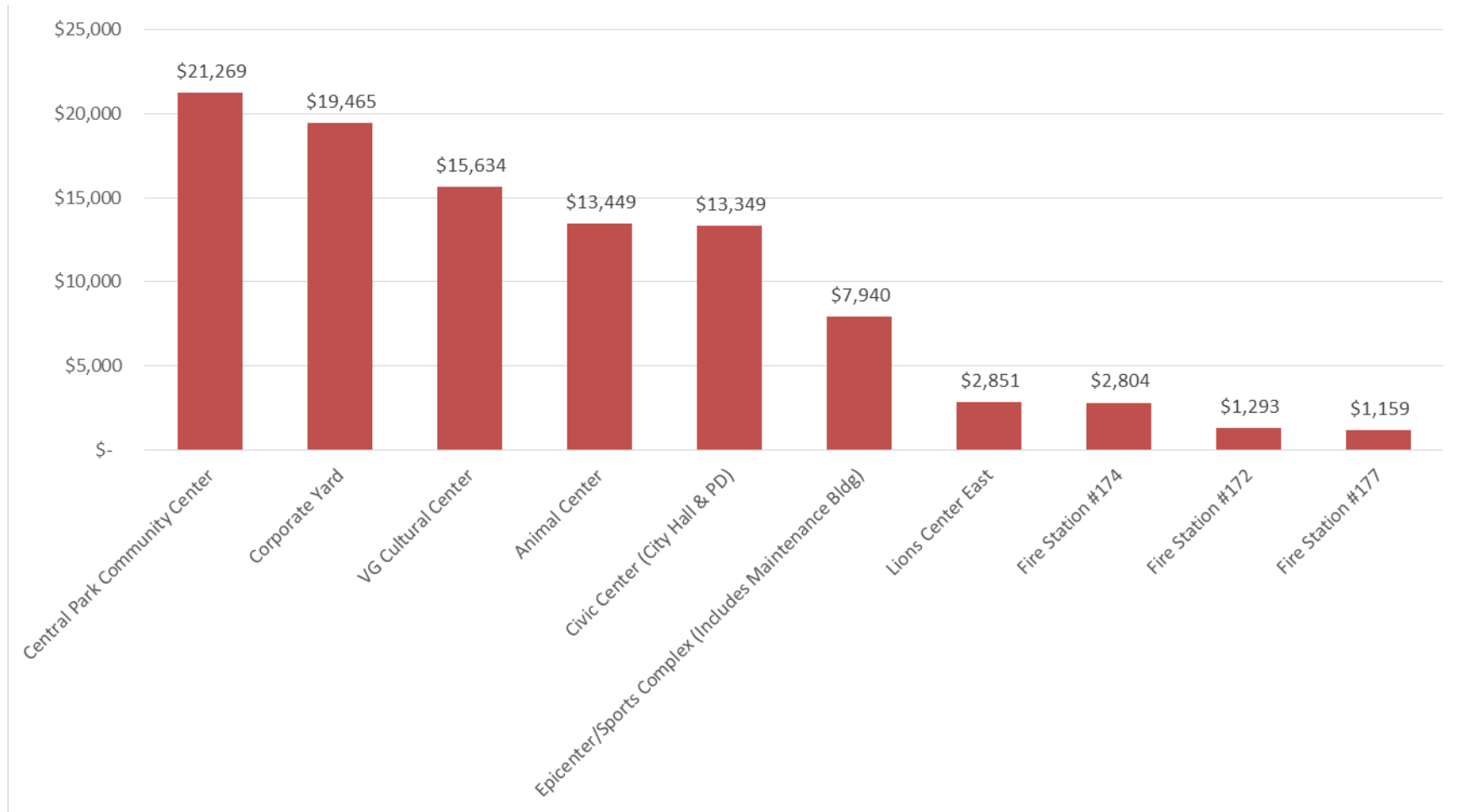


Figure 3.8 – Ten Facilities with Highest Annual Natural Gas Cost Intensity (\$/ft²)

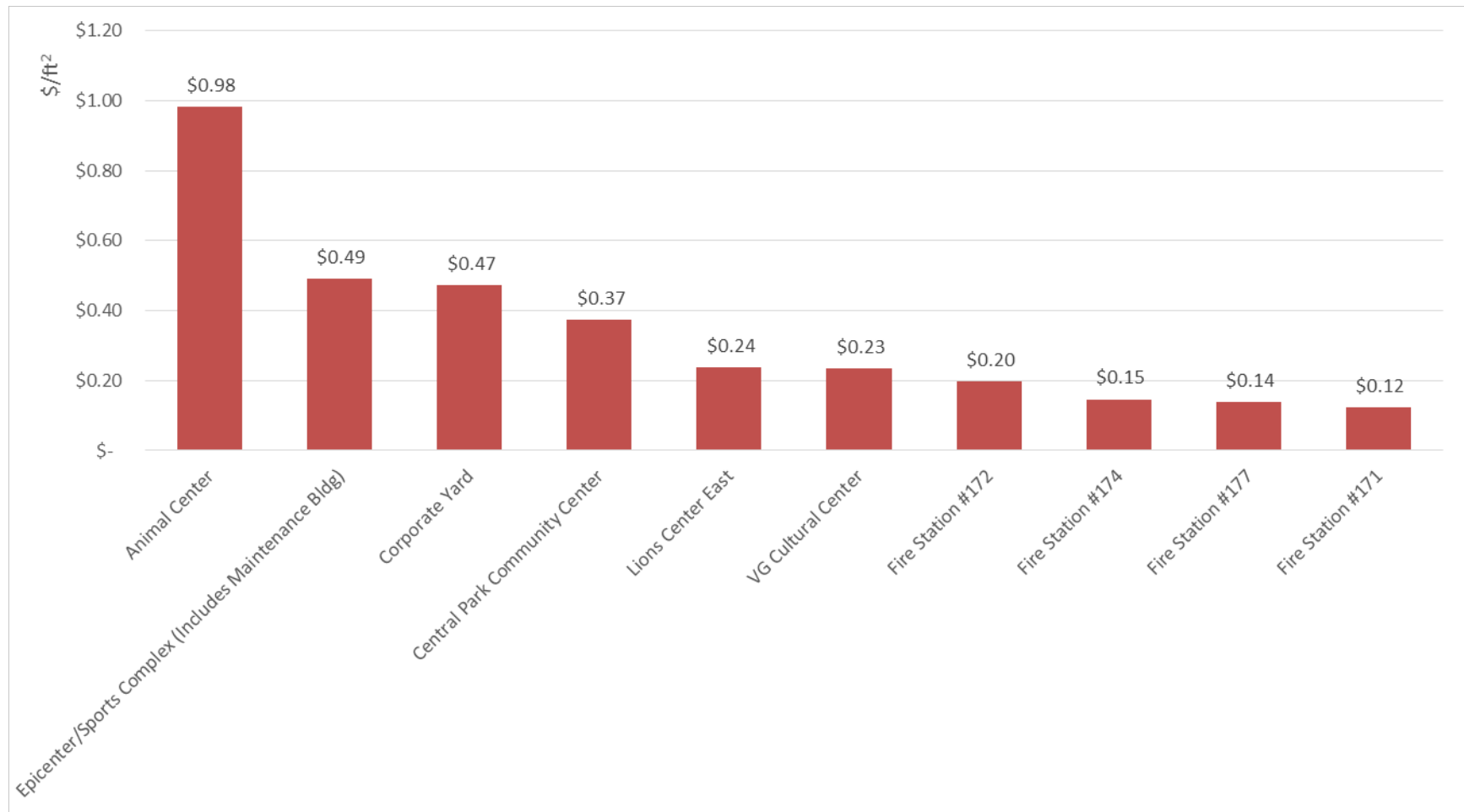


Figure 3.9 – Ten Facilities with Highest Combined Annual Energy Cost (Thousands \$)

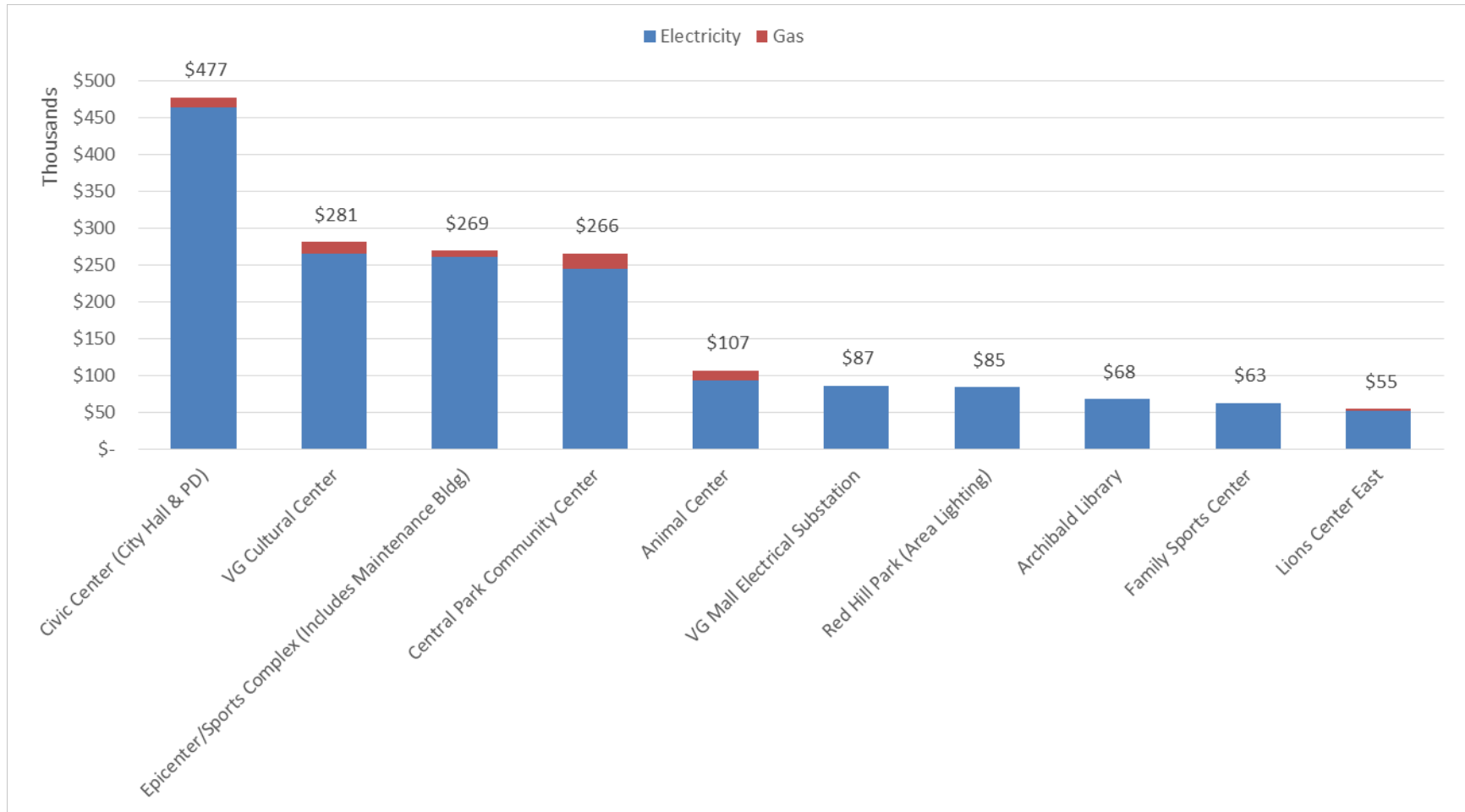
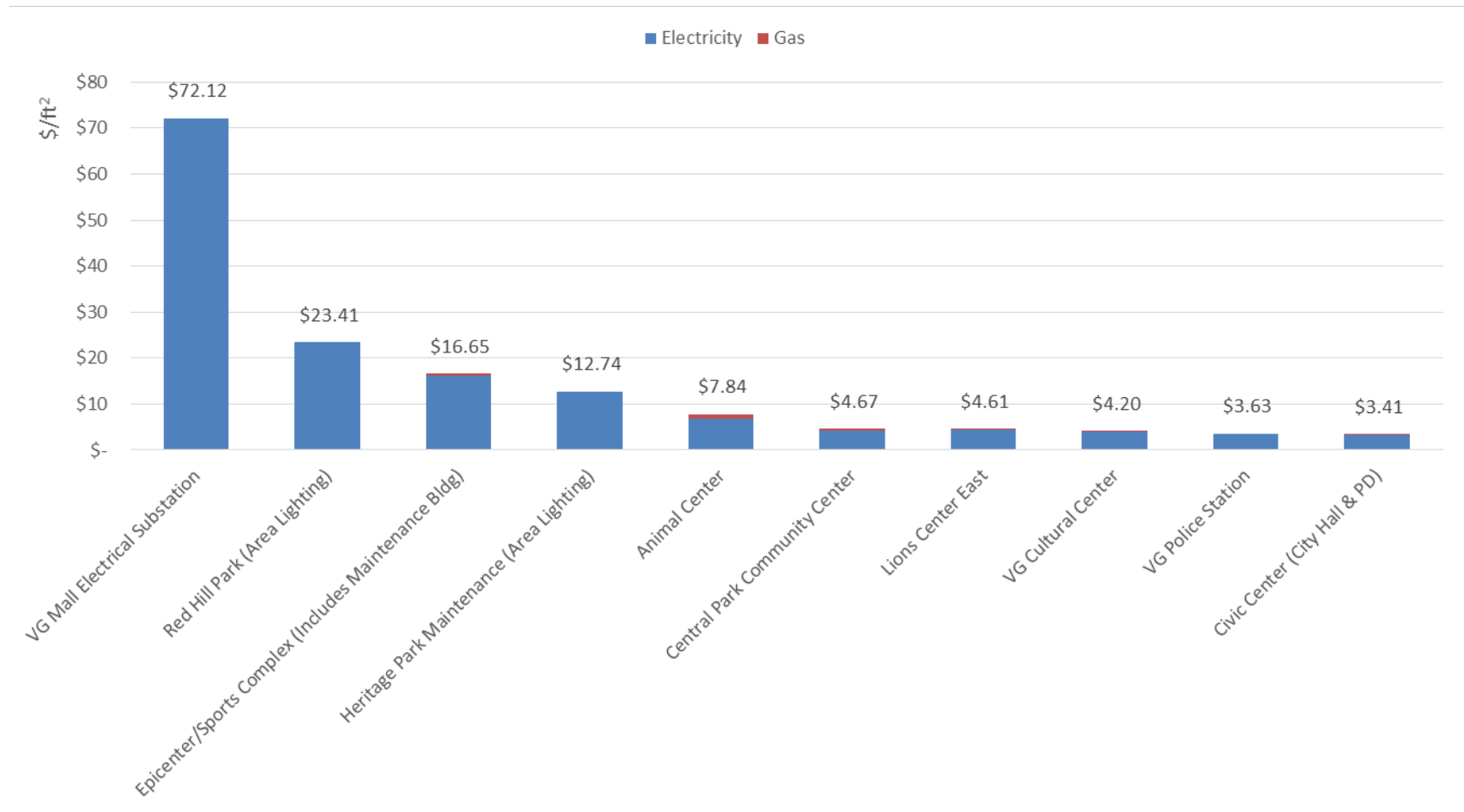


Figure 3.10 – Ten Facilities with Highest Combined Annual Energy Cost Intensity (\$/ft²)



4. Notes on Methodology

- All electricity and gas results were based on usage during period October 2014 – September 2014.
- Energy usage and cost data used in this analysis were derived from utility billing data provided by City staff.
- Monthly usage data from individual meters were assigned to the City facilities using a combination of matching information provided by City staff and supplemental research.
- Facility names, types, and floor area information for most facilities were provided by City staff, The Energy Network and Energy Solutions. Errors in floor area information can have a significant effect on energy intensity calculations. It is recommended that all floor area information be verified as part of any closer investigation of facilities analyzed in this report.
- The VG Mall Electrical Substation was excluded from table 2.1 as it is a special rate facility that has very little square footage and no data available for demand or total kWh. Only cost data was provided for this facility. Considering this facility and its associated use are for specific special purposes, it was appropriate to exclude it from table 2.1.
- Facilities without electric data were excluded from the min and max in table 2.1 as these facilities are likely served by RCMU, but no electricity bill data was provided.
- **Table 4.1** is a summary of the facilities included in this Comparative Energy Analysis.

Table 4.1 – Facilities Included in this Comparative Energy Analysis

Facility Name	Street	Data	Gas Interval Data	Facility Type	Electric Area (ft2)	Gas Area (ft2)
Civic Center (City Hall & PD)	10500 Civic Center Drive	Monthly	Monthly	Office	140,000	140,000
VG Cultural Center	12505 Cultural Center Drive	Monthly	Monthly	Recreation	67,000	67,000
Epicer/Sports Complex (Includes Maintenance Bldg)	8408 Rochester Avenue	Monthly	Monthly	Recreation	16,181	16,181
Central Park Community Center	11200 Baseline Rd	Monthly	Monthly	Recreation	57,000	57,000
Animal Center	11780 Arrow Rte (Hwy)	Monthly	Monthly	Office	13,680	13,680
VG Mall Electrical Substation	8275 Rochester Ave	Monthly	No Data Available	Electrical	1,200	1,200
Red Hill Park (Area Lighting)	7484 Vineyard Ave	Monthly	No Data Available	Area Lighting	3,615	3,615
Archibald Library	7368 Archibald Ave	Monthly	No Data Available	Office	25,498	25,498
Family Sports Center	9059 San Bernardino Rd	Monthly	Monthly	Recreation	34,000	34,000
Lions Center East	9191 Baseline Rd	Monthly	Monthly	Recreation	12,000	12,000
Fire Station #174	11297 Jersey Blvd	Monthly	Monthly	Fire Services	19,200	19,200
RC Family Resource Center	9791 Arrow Rte (Hwy)	Monthly	Monthly	Office	10,361	10,361
Corporate Yard	9153 9th Street	No Data Available	Monthly	Maintenance	41,249	41,249
VG Police Station	7743 Kew Ave	Monthly	No Data Available	Offices	3,500	3,500
Heritage Park Maintenance (Area Lighting)	5546 Beryl Street	Monthly	No Data Available	Area Lighting	867	867
Heritage Park Equestrian Center (Area Lighting)	5546 Beryl Street	Monthly	No Data Available	Area Lighting	3,045	3,045
Lions Center West	9161 Baseline Rd	Monthly	Monthly	Recreation	10,228	10,228
Fire Station #172	9612 San Bernardino Rd	No Data Available	Monthly	Fire Services	6,549	6,549
Fire Station #177	9270 Rancho St	No Data Available	Monthly	Fire Services	8,330	8,330
Fire Station #175	11108 Banyan St	No Data Available	Monthly	Fire Services	19,200	19,200
Fire Station #171	6627 Amethyst St	No Data Available	Monthly	Fire Services	7,200	7,200