



DOE GRANT DE-EE00003521

TECHNICAL REPORT

GRANT RECIPIENT – CITY OF REDLANDS

May 26, 2016

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A. PROJECT OBJECTIVES

The outcomes of these upgrades include an estimated savings to the City and the power grid of 720 kilowatts in peak energy load. This outcome includes the benefit of lower operating costs for the City, conservation of energy resources and increased availability of energy to the grid during peak times of energy use.

The goals and objectives of the HVAC upgrades are to replace equipment as old as twenty-three (23) years in five different facilities. The project will upgrade some facilities from SEER ratings of 9 to SEER ratings of 14 at a savings of 556 kilowatt hours per ton (savings depends on specific size of the system). In addition to these objectives, the project will also install comprehensive HVAC control systems to maximize the efficiency of all HVAC upgrades.

The expected outcomes of these upgrades emphasize savings capture; it is anticipated to save the City's 42% in space heating and cooling costs.

B. PROJECT RESULTS

The City of Redlands is a full-service, general law city incorporated in 1888 with a population of approximately 75,000. The City has 9 departments and approximately 500 full-time employees located in various centers throughout the City. The City operates its own historic library, police department, fire department, airport, landfill, solid waste service, cemetery and water utility.

As a result of having such wide spread and aging facilities, a majority of the air conditioning and heating systems throughout the City were well over 20 years old, with limited capabilities, and no energy efficiency. The average temperature in Redlands during summer months is a high of 113 degrees in July to a low of 19 degrees in January.

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This grant enabled the City to replace 44 existing HVAC units at different locations, with upgraded, energy efficient (SEER 14 *minimum*) HVAC units. In addition, 25 thermostat units were replaced with upgraded, programmable “smart” thermostats that offer greater control of energy use and comfort for staff and residents.

On average, the City has increased energy efficiency with these new units by 67.28% which is a 39.22% over original grant application estimates.

The most drastic improvement we have seen (53%) is at the City’s Community and Senior Center.

The City of Redlands Community and Senior Center facilities are used 7 days a week, with varying hours of use. One room may be used for dance instruction while simultaneously, another room if being used for sewing instruction or yoga. Previously, one temperature had to be set for the entire facility while using ageing, ineffective HVAC units running 10 to 12 hours per day. With the new, more energy efficient units, varying temperatures can be set according to the use of the room and the length of time the room will be used. In addition, the new units are so much more efficient that the entire facility takes less time to heat or cool.

Senior Centers in our City are also used as emergency “cool down “centers. This means that all residents are welcomed into our centers to enjoy an air conditioned environment when we experience extended periods of extreme heat. With the new equipment, there have been no breakdowns and no repairs. We are able to keep our community cool in a safe place.

Note: July 2015 kWh deviation (high) in power consumption at the City’s Corporate Yard Sign Shop was due to increased staffing levels and hours to meet production needs of a street improvement project.*

Day and Night HVAC units are a CARRIER product which is based in the United States.

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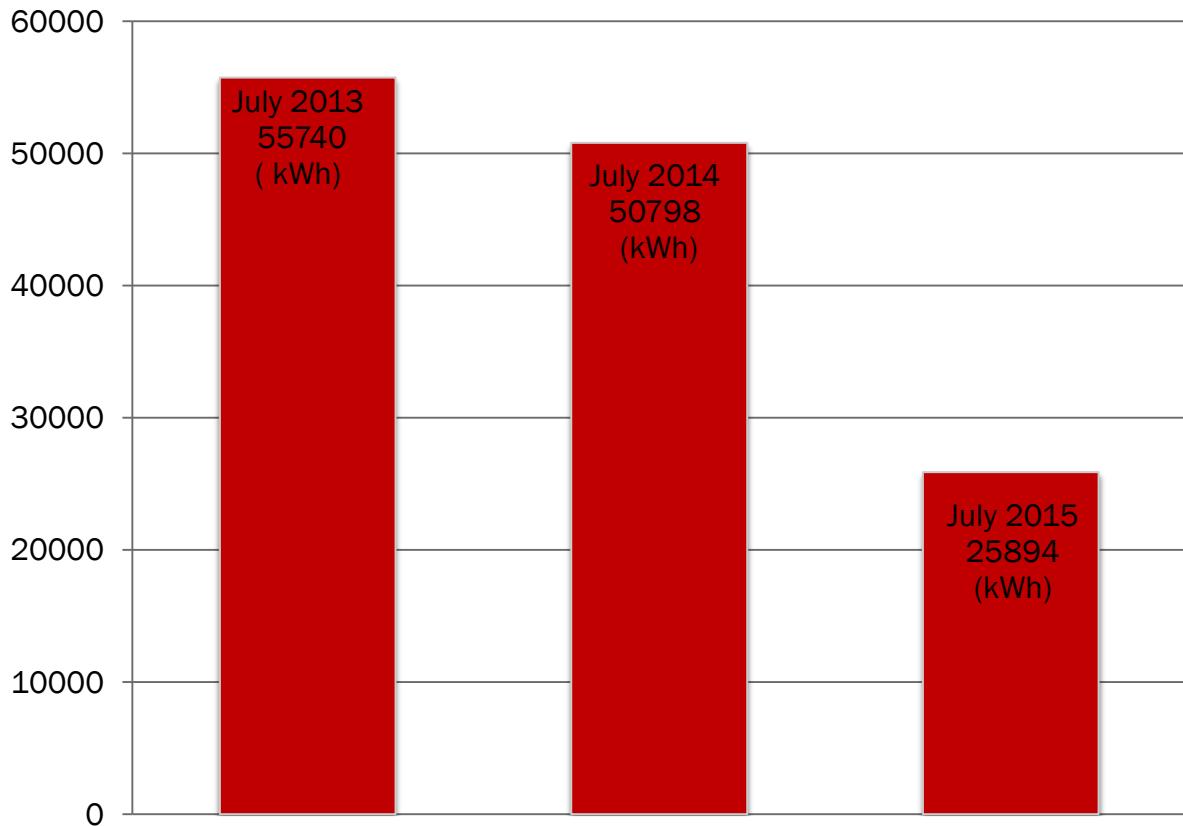
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ENERGY EFFICIENCY EXPERIENCED PER LOCATION
OVER A 3 YEAR PERIOD (2013 vs. 2015)

Community Center

53% Energy Savings

July Temperatures Avg. 101 Degrees



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PRODUCTS INSTALLED

Community Center

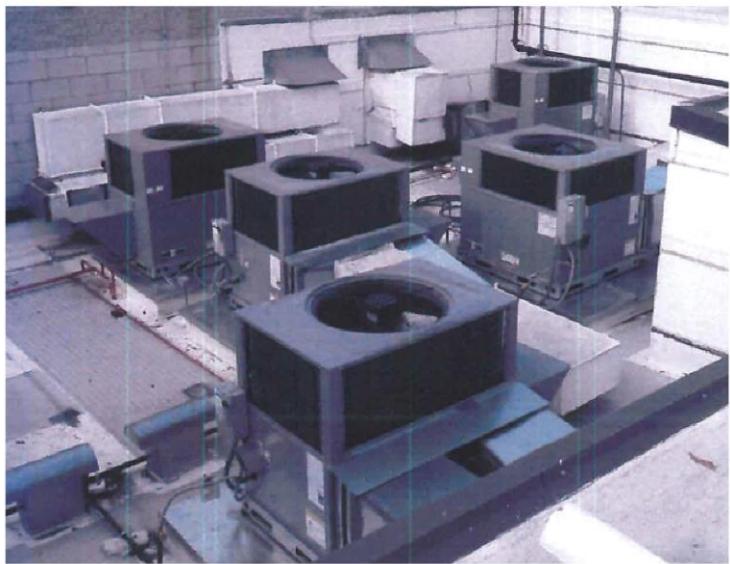
MANUFACTURER	MODEL	SERIAL NUMBER
Day and Night	PGD442060H001C	C143825893
Day and Night	PGD436060H001C	C143800302
Day and Night	PGD436060J001C	C143800295
Day and Night	PGD436060H001C	C143806301
Day and Night	PGD436060H001C	C143800300
Day and Night	PGD460090H001C	C143825997
Day and Night	PGD460090H001C	C143825996
Day and Night	PGD460090H001C	C143825998
Day and Night	PGD460090H001C	C143825999
Day and Night	RGH102HDCA0AAA	P140261845
Day and Night	RGH240HDCU0AAT	P144015197
Day and Night	RGH240HDCU0AAT	P144015198
Day and Night	RGH036HLCA0AA	C143871560
Day and Night	RGH036HLCA0AAA	C143871561
Day and Night	RGH036HLCA0AAA	C124175610
Day and Night	PGH048HLCA0AAA	C142580611
Day and Night	PGH048HLCA0AAA	C140276849
Day and Night	PHH060HOCA0AAA	C143876782
Day and Night	RGH120HDCA0AAA	P141182432
Venstar Thermostats	T2800 (13)	
Venstar Thermostats	T2900 (2)	

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PHOTO's

Community Center

111. W. Lugonia Avenue

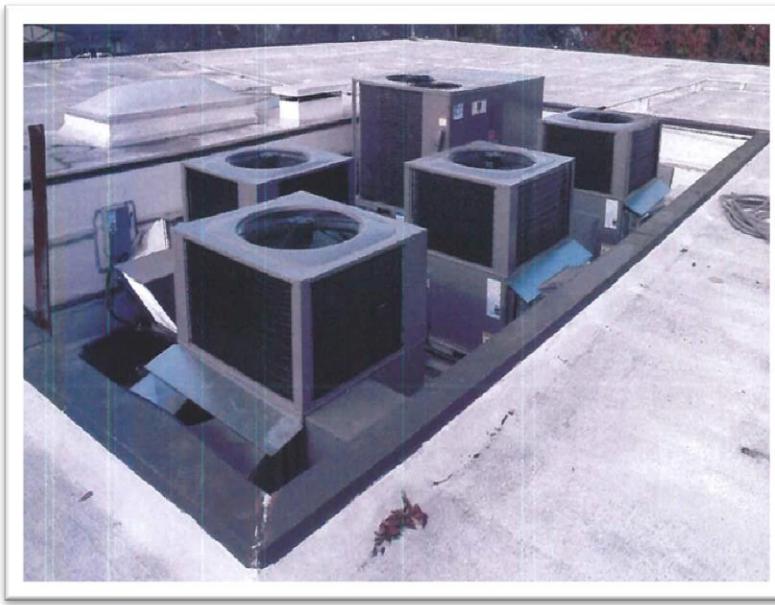


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PHOTO's

Community Center

111. W. Lugonia Avenue



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PHOTO's

Community Center

Location: 111. W. Lugonia Avenue



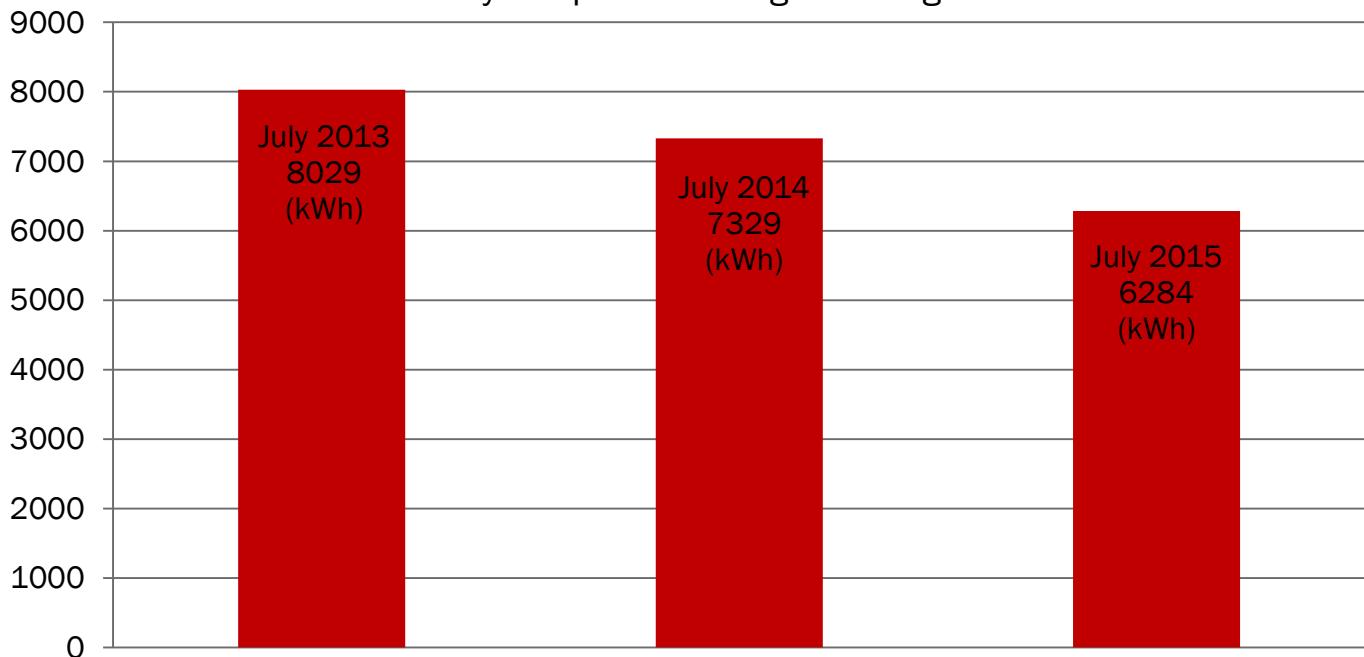
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ENERGY EFFICIENCY EXPERIENCED PER LOCATION
OVER A 3 YEAR PERIOD (2013 vs. 2015)

Fire Station 3

22% Energy Savings

July Temperatures Avg. 101 Degrees



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PRODUCTS INSTALLED

Fire Station 1

Location: 10 W. Pennsylvania Avenue

MANUFACTURER	MODEL	SERIAL NUMBER
Day and Night	PGD436060H001C	C143800299
Day and Night	PGD436060H001C	C143800296
Day and Night	PGD460090H001C	C143825995
York	PGD460090H001C	
Venstar Thermostats	T2800 (2)	

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PHOTO

Fire Station 3

Location: 10 W. Pennsylvania Avenue



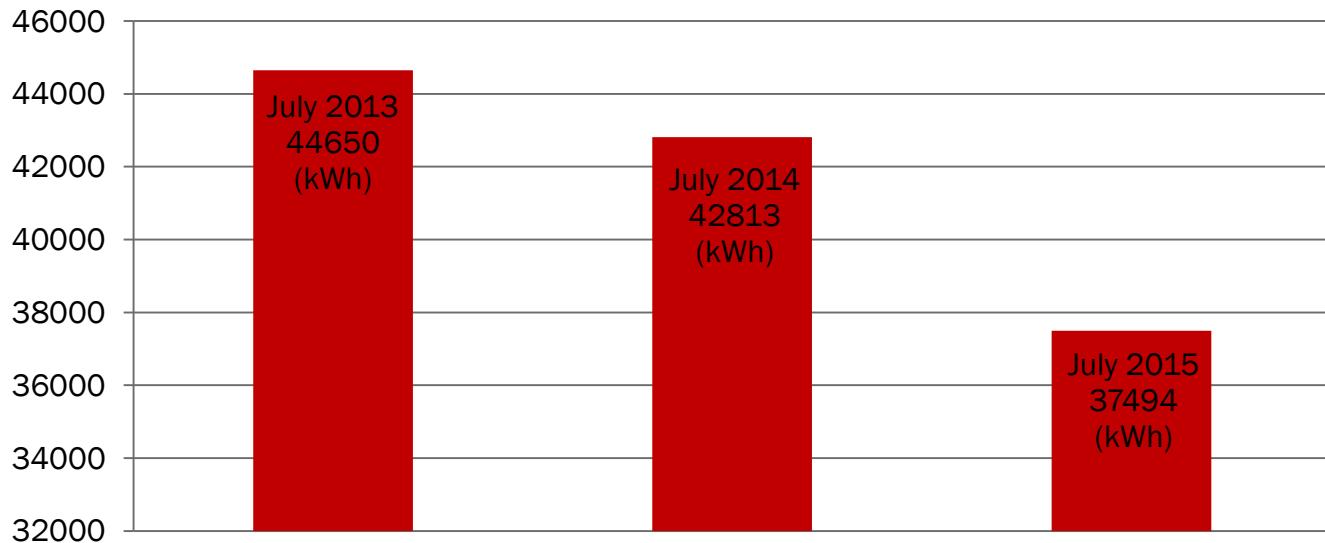
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ENERGY EFFICIENCY EXPERIENCED PER LOCATION
OVER A 3 YEAR PERIOD (2013 vs. 2015)

Corporate Yard Bldg. A

17% Energy Savings

July Temperatures Avg. 101 Degrees



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PRODUCTS INSTALLED

Corporate Yard Building A

Location: 1270 W Park Avenue

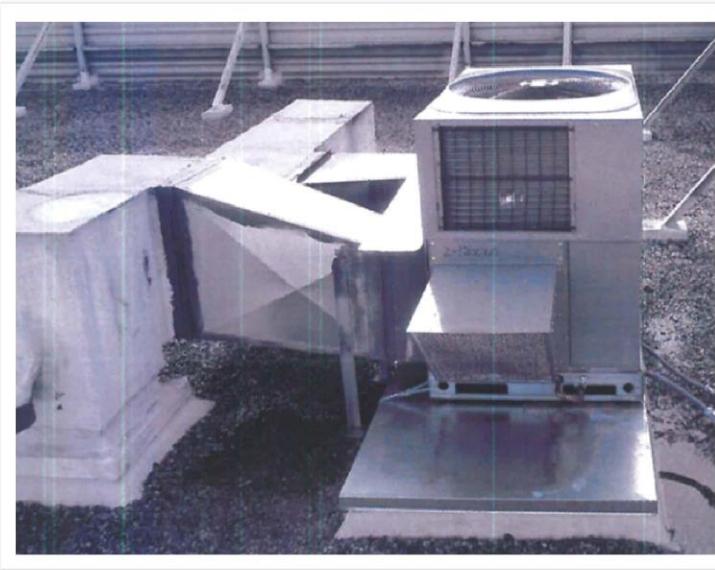
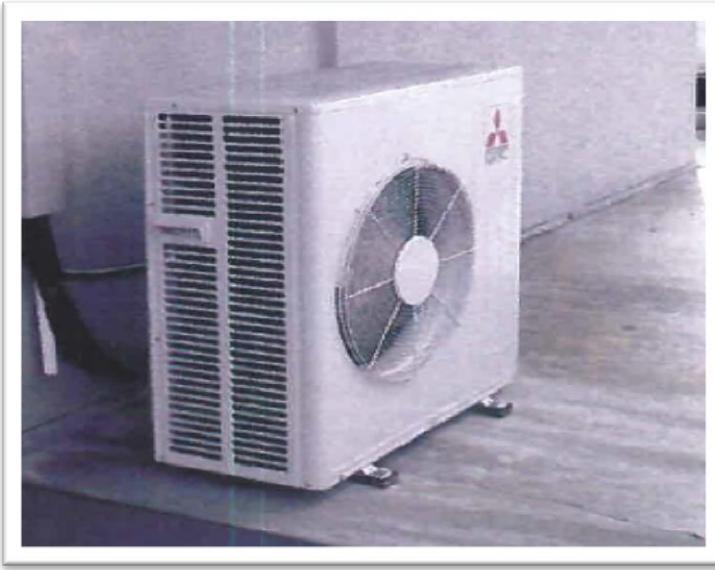
MANUFACTURER	MODEL	SERIAL NUMBER
Day and Night	PGD430000K000D	C133016675
Day and Night	PFS650A	2499605
Day and Night	PFS650A	2499834
Mitsubishi	MUZHE24NA	S40004303T
Mitsubishi	MSZHE24NA	S4000384T
Venstar Thermostats	T2800 (2)	

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PHOTO

Corporate Yard Building A

Location: 1270 W. Park Avenue



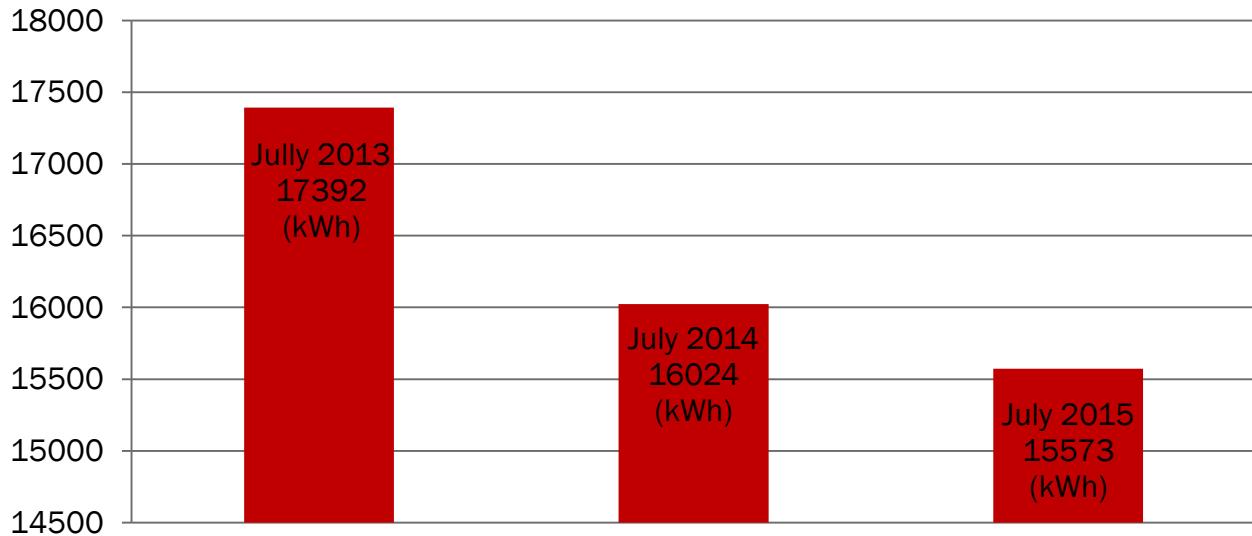
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ENERGY EFFICIENCY EXPERIENCED PER LOCATION
OVER A 3 YEAR PERIOD (2013 vs. 2015)

Corporate Yard Bldg. B

11% Energy Savings

July Temperatures Avg. 101 Degrees



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PRODUCTS INSTALLED

Corporate Yard Building B

Location: 1270 W Park Avenue

MANUFACTURER	MODEL	SERIAL NUMBER
Day and Night	PHD448000K000D	C142032467
Day and Night	PHD448000K000D	C143347395
Day and Night	PFS650A	2494932
Day and Night	PFS650A	2494948
Day and Night	PFS650A	2494937
Venstar Thermostats	T2800 (2)	

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PHOTO

Corporate Yard Building B

Location: 1270 W. Park Avenue



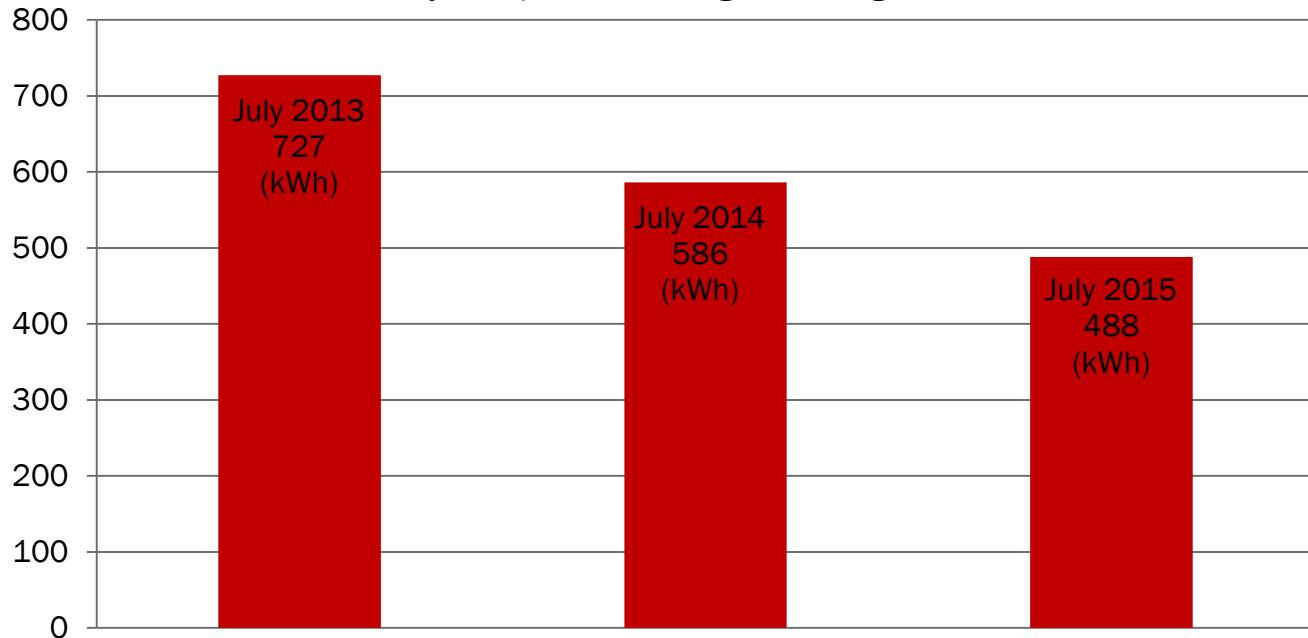
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ENERGY EFFICIENCY EXPERIENCED PER LOCATION
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Corporate Yard Bldg. C

33% Energy Savings

July Temperatures Avg. 101 Degrees



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PRODUCTS INSTALLED

Corporate Yard Building C

Location: 1270 W Park Avenue

MANUFACTURER	MODEL	SERIAL NUMBER
Day and Night	PHD430000K000D	C133016674
Day and Night	PHD448000K000D	C143347398
Day and Night	PHD448000K000D	C143347391
Day and Night	PHD448000K000D	C142943263
Day and Night	RGH072HDCAOAAA	P143634279
Day and Night	PHD460000K000D	C142639642
Day and Night	PHD460000K000D	C14263943

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PHOTO

Corporate Yard Building C



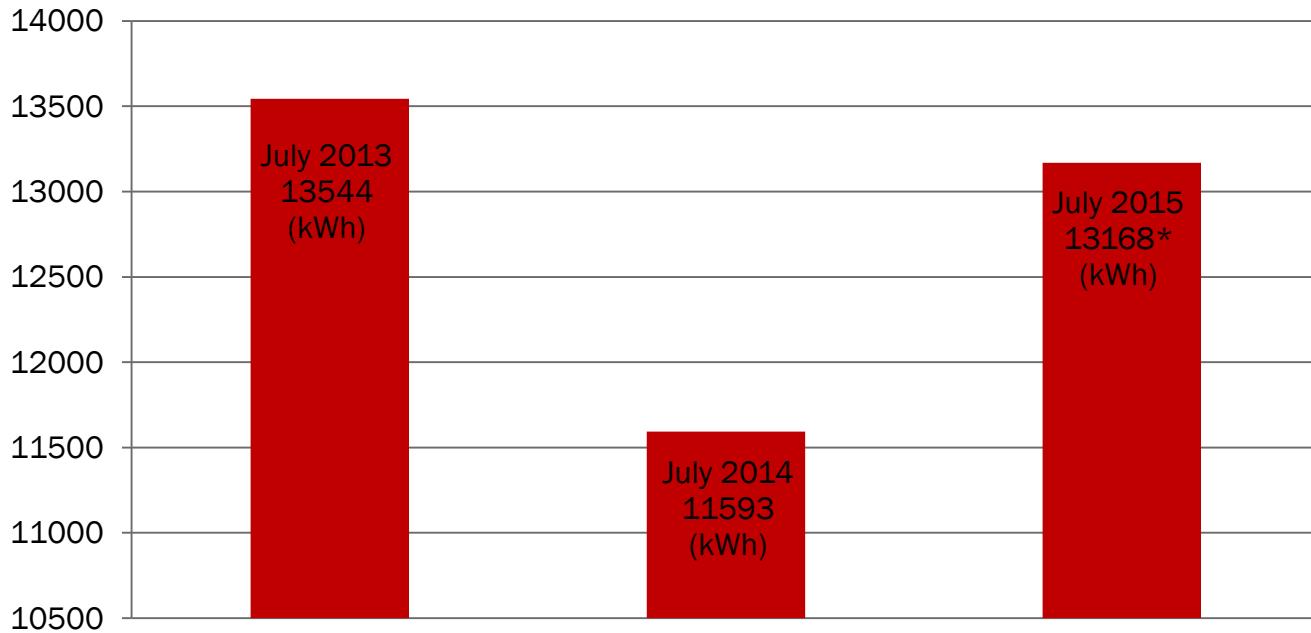
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ENERGY EFFICIENCY EXPERIENCED PER LOCATION
OVER A 3 YEAR PERIOD (2013 vs. 2015)

Corporate Yard Sign Shop

3% Energy Savings

July Temperatures Avg. 101 Degrees



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PRODUCTS INSTALLED

Corporate Yard Sign Shop

Location: 1270 W Park Avenue

MANUFACTURER	MODEL	SERIAL NUMBER
Day and Night	PHD0448000K000D	C143347397
Day and Night	PH1425	2503695
Mitsubishi	MSYGE09NA8	S4002107T
Mitsubishi	MUYGE09NA	S4000814T
Venstar Thermostats	T2800 (3)	

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PHOTO

Corporate Yard Sign Shop



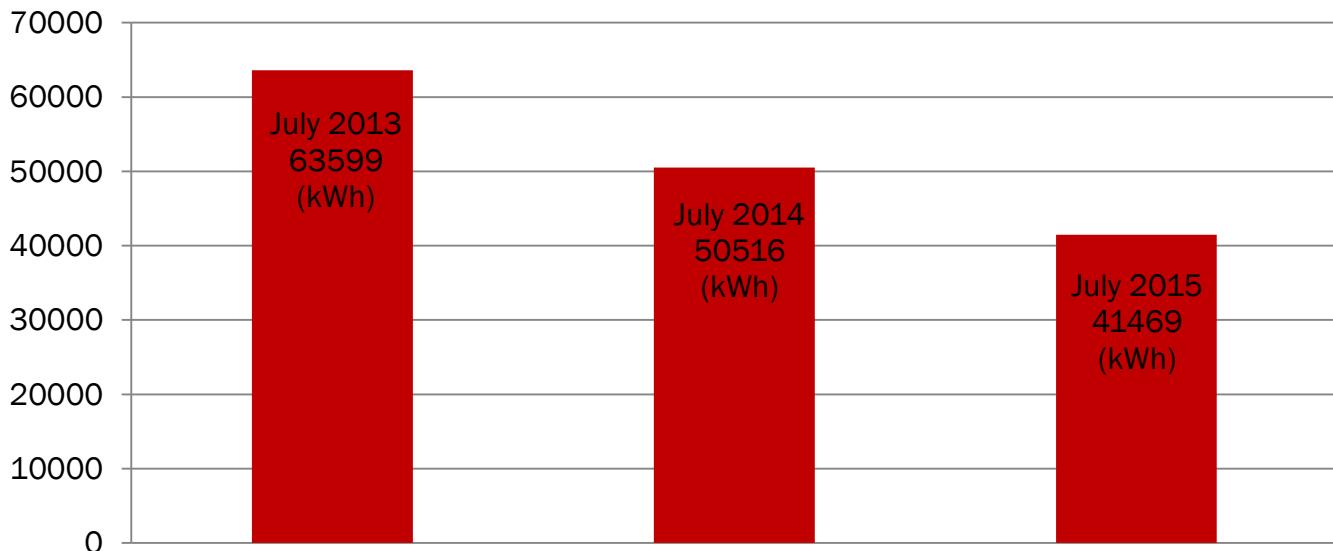
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ENERGY EFFICIENCY EXPERIENCED PER LOCATION
OVER A 3 YEAR PERIOD (2013 vs. 2015)

AK Smiley Library

35% Energy Savings

July Temperatures Avg. 101 Degrees



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PRODUCTS INSTALLED

AK Smiley Library

Location: 125 Vine Street

MANUFACTURER	MODEL	SERIAL NUMBER
JL Wingert Co. Separator System	CT-0038	
Carrier AQUASNAP - 30MPA, MPW015-045		
Liquid Chiller with Scroll Compressors and <i>ComfortLink</i> Controls		