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Alachua County LED & Solar LED Lighting Installation Review

Mr. Mclendon-

The DRMP team has completed a review of considerations for potentially installing new LED and solar LED fixtures at County facilities. The DRMP team compiled existing lighting information from a variety of sources, determined potential capital program costs, estimated ongoing maintenance costs, coordinated preliminary specifications and pricing for multiple lighting fixtures/support structures, and evaluated the available billing structure options of Gainesville Regional Utilities (GRU) for current and potential County utility accounts. This report will provide an overview of the information gathered, outline potential considerations for LED/Solar LED installations, and provide a recommendation for the County based on available data. Our recommendations are based on assumptions made to provide a broad range of possible costs to guide future in-depth analysis by the County. The team has estimated potential costs to:

- Replace Alachua County's parking lot streetlights with GRU-owned LED lights
- Alachua County installing and maintaining their own LED lighting system for parking lots
- Alachua County installing and maintaining a Solar/LED system for parking lot lighting.

Assumptions

The goal of the study was to help the County evaluate options for existing parking lot lighting on various County -owned parcels. The outcome of the study is meant to provide some insight into options but does not consist of all costs associated with each system. The DRMP team has considered the local utility net metering policies and rates as part of this analysis. Utility bills include a number of variable charges that were not considered as part of this analysis. All provided estimates are provided using the Government Agency Rental rate structure currently in place with Gainesville Regional Utilities. The team did not consider additional items on utility bills such as the Fuel Adjustment Tax, only the monthly cost of renting light fixtures and structures. The team had to make several assumptions up front to estimate the correlation of each light in the County inventory to LED or Solar LED. The options should not be taken as a literal 1:1 replacement of the existing due to several reasons:

- Current layout may not meet code and best practices for safe and appropriate illumination levels
- GRU doesn't have LED rental lights that replace certain existing lumen output, distribution and wattage
- Solar LED options require a minimum an increase of 25% for number of pole/light locations and lower poles.

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In addition, specific site design fees and other miscellaneous costs have not been covered to implement a lighting option. Problematic sites can increase the costs for design and labor for installation. The timing of option implementation and selection of consultants to execute service of work will impact the final cost as well.

Current Lighting

Currently, over 90 different light fixtures and pole structures are used to light County parking lots and facilities. Alachua County staff provided summaries for each facility's current lighting fixtures and wattage. Using GRU rental agency lighting costs from the most recent (prior to rate increase of October 2019) Public Agency Light Rate Class (Governmental – Contributed), the annual rental costs and annual energy consumption and costs were calculated for all parcels and included area lighting of 100-400 HPS/MH. Flood lights of 250 watts and 400 watts were not included due to limited GRU LED options that do not have products to replace traditional floodlights. Per Darksky, it is not recommended to use floodlights due to the contribution to light pollution based on the performance of the traditional flood type distribution. Most floodlights are not considered "full cut-off" and do not meet City of Gainesville Lighting Ordinance. Figure 1 below illustrates the most common lighting types that can be correlated directly with the GRU inventory for LED as well as two examples for common LED light fixtures used by GRU for replacement. Illustrated at the bottom of Figure 1 in blue are the approximate system and energy costs for these traditional GRU fixtures.

Figure 1- Existing traditional light fixtures offered by GRU

TRADITIONAL SYSTEMS								
1	2	3	4	5	6	7	8	LUMINAIRE DEFINITION
L14	L11	L15	L16	L17	L23	L39	L51	Fixture Brand
Cutoff Street Light	Cutoff Street Light	Box Light	Cutoff Street Light	Bl Round	Cutoff Street Light	Cutoff Street Light	Cutoff Street Light	Fixture Model
HPS	HPS	HPS	HPS	MH	HPS	LED	LED	Lamp Type
190	130	190	295	464	464	79	135	Input Watts Per Luminaire
APPLICATION								
138	63	59	122	14	20	1	2	Fixture Quantity
12	12	12	12	12	12	12	12	Operating Hours/Day-Full Power
POWER CALCULATIONS								
26.220	8.190	11.210	35.990	6.496	9.280	0.079	0.270	Total kW
4,380	4,380	4,380	4,380	4,380	4,380	4,380	4,380	Annual Operating Hours (365 days)
114,844	35,872	49,100	157,636	28,452	40,646	346	1,183	Annual kWh
LUMINAIRE COSTS								
$ 181.00	$ 192.00	$ 237.00	$ 245.40	$ 669.00	$ 260.76	$ 129.60	$ 206.40	Per Luminaire Cost (w/lamp)
$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	Installation Cost (Per Luminaire)
ANNUALIZED TRADITIONAL COST SUMMARY								
$ 24,978	$ 12,096	$ 13,983	$ 29,939	$ 9,366	$ 5,215	$ 130	$ 413	Total Traditional System Cost
$ 15,826	$ 4,943	$ 6,766	$ 21,723	$ 3,921	$ 5,601	$ 48	$ 163	Annual Traditional Energy Cost
$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	Annual Traditional Maintenance Cost

LED Equivalency

To convert the existing lighting inventories at each site to equivalent LED/Solar LED installations and the traditional GRU area lighting with GRU LED, a simple 1:1 approach was taken to simplify the model and give a general estimate for this lighting system. Using the GRU Rental Rates and product information, LED "equivalents" were used to calculate annual rental cost and annual energy consumption and cost but should not be considered a true product comparison for every light type. The team assumed that each light on site would need to be replaced with an LED fixture and used common replacement fixture types from GRU as a substitute for specific site-by-site evaluations.

An LED light source does not necessarily need to have the same lumens as the lamp it is replacing. The product distribution, color rendering index, color temperature, mounting and efficacy are all important components of a good lighting design that will include lighting calculations to ensure the proper product is selected. Higher color rendering is safer to evaluate items such as color of a car in

a parking lot. Using a color temperature that is closer to 3000K is better for plants, animals and general nighttime illumination. Glare of the final product should be considered for safety as well. Many cheap LED roadway and area lights have a high glare factor that can be dangerous and cause visibility issues for drivers at night. All these elements have not been considered for this study but need to be considered for any site-specific installation. Equivalent LED fixtures were used to establish the baseline to compare the current traditional lighting inventory costs against the LED installation options that would be installed and maintained by GRU.

GRU Installed and Maintained Option

Base on the assumptions for LED equivalency, the DMRP team calculated the quantities of LED fixtures required for replacements at each site and correlated the approximate total energy usage and cost. The inventory quantity stays essentially the same, but the County could expect an immediate savings on energy consumption (as illustrated in the summary of Figure 2). It is difficult to estimate the cost of any replacements or needed maintenance required in this contract. DRMP recommends the County work with GRU to review maintenance activity performed at parking lots for the State Attorney's office and the County Sheriff.

Figure 2- Estimate of the needed GRU supplied and maintained LED equivalent fixtures

	LED							
LUMINAIRE DEFINITION	1	2	3	4	5	6	7	8
Fixture Brand	L40	L39	L40	L41	L41	L41	L39	L51
Fixture Model	Cutoff Street Light	Cutoff Street Light	Cutoff Street Light	Cutoff Street Light	Cutoff Street Light	Cutoff Street Light	Cutoff Street Light	Cutoff Street Light
Lamp Type	LED	LED	LED	LED	LED	LED	LED	LED
Input Watts Per Luminaire-Full Power	111	79	111	196	196	196	79	135
APPLICATION								
Fixture Quantity	138	63	59	122	14	20	1	2
Operating Hours/Day-Full Power	12	12	12	12	12	12	12	12
POWER CALCULATIONS								
Total kW	15.318	4.977	6.549	23.912	2.744	3.920	0.079	0.270
Total kW Saved	10.902	3.213	4.661	12.078	3.752	5.360	-	-
Annual Operating Hours (365 days)	4,380	4,380	4,380	4,380	4,380	4,380	4,380	4,380
Annual kWh	67,093	21,799	28,685	104,735	12,019	17,170	346	1,183
Annual kWh Saved	47,751	14,073	20,415	52,902	16,434	23,477	-	-
LUMINAIRE COSTS								
Per Luminaire Cost	$ 145.20	$ 129.60	$ 148.20	$ 207.00	$ 207.00	$ 207.00	$ 129.60	$ 206.40
Installation Cost (Per Luminaire)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Rebate Per Fixture (If Applicable)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Rebate Per kWh Saved 1st Year (If Applicable)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Rebate Per kW Saved (If Applicable)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Accelerated Tax Depreciation (%)	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Accelerated Tax Depreciation Savings	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
EPAct Tax Deduction	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Combined 1st Year Cost Offset (Rebate + Tax Benefit)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
ANNUALIZED LED COST SUMMARY								
Total LED System Cost	$ 20,038	$ 8,165	$ 8,744	$ 25,254	$ 2,898	$ 4,140	$ 130	$ 413
Annual LED Energy Cost	$ 9,246	$ 3,004	$ 3,953	$ 14,433	$ 1,656	$ 2,366	$ 48	$ 163
Annual LED Maintenance Cost	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -

County Installed and Maintained LED Lighting Option

An additional option the County wished to investigate was the ability for the County to install and maintain their own LED lighting system. This would still require GRU meters for each site as the system will be tied into GRU's overall electrical distribution. An electrical contractor from Pensacola, FL provided estimates for installing new poles and demolition of existing ones. The demolition cost was not included in the calculation. The final costs of pole installation will vary due to industry conditions and contactor. If construction activity is high, contractors usually charge a premium due to stretched resources. To keep up with increased costs in the market, the estimated installation cost of $6,500 per pole was used to be more conservative on cost expectations (Figure 3). Also added to the study were costs for LED driver replacements and a consideration of maintenance. There are various sources where parts can be purchased either on-line or locally. Pricing from the local company Graybar has not been included, but the County may be able to get better pricing from them versus on-line. Costs for the non-GRU lighting and poles were provided by the RS Means catalog (nationwide construction estimating database) and validated with on-line

sources for products similar to GRU LED products. Demolition of the existing poles was not included in the calculation but added as a note.

Figure 3- Estimate of the costs for County installed and owned LED fixtures

	LED							
LUMINAIRE DEFINITION	1	2	3	4	5	6	7	8
Fixture Brand	LED	LED	LED	LED	LED	LED	LED	LED
Fixture Model	Cutoff Street Light	Cutoff Street Light	Cutoff Street Light	Cutoff Street Light	Cutoff Street Light	Cutoff Street Light	Cutoff Street Light	Cutoff Street Light
Lamp Type	LED	LED	LED	LED	LED	LED	LED	LED
Input Watts Per Luminaire-Full Power	111	79	111	196	196	196	79	135
APPLICATION								
Fixture Quantity	138	63	59	122	14	20	1	2
Operating Hours/Day-Full Power	12	12	12	12	12	12	12	12
POWER CALCULATIONS								
Total kW	15.318	4.977	6.549	23.912	2.744	3.920	0.079	0.270
Total kW Saved	10.902	3.213	4.661	12.078	3.752	5.360	-	-
Annual Operating Hours (365 days)	4,380	4,380	4,380	4,380	4,380	4,380	4,380	4,380
Annual kWh	67,093	21,799	28,685	104,735	12,019	17,170	346	1,183
Annual kWh Saved	47,751	14,073	20,415	52,902	16,434	23,477	-	-
LUMINAIRE COSTS								
Per Luminaire Cost	$ 2,300.50	$ 2,265.50	$ 2,300.50	$ 2,451.50	$ 2,451.50	$ 2,451.50	$ 2,265.50	$ 2,276.50
Installation Cost (Per Luminaire)	$ 6,500.00	$ 6,500.00	$ 6,500.00	$ 6,500.00	$ 6,500.00	$ 6,500.00	$ 6,500.00	$ 6,500.00
Rebate Per Fixture (If Applicable)	$ 75.00	$ 75.00	$ 75.00	$ 75.00	$ 75.00	$ 75.00	$ 75.00	$ 75.00
Rebate Per kWh Saved 1st Year (If Applicable)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Rebate Per kW Saved (If Applicable)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Accelerated Tax Depreciation (%)	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Accelerated Tax Depreciation Savings	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
EPAct Tax Deduction	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Combined 1st Year Cost Offset (Rebate + Tax Benefit)	$ 10,350.00	$ 4,725.00	$ 4,425.00	$ 9,150.00	$ 1,050.00	$ 1,500.00	$ 75.00	$ 150.00
LED MAINTENANCE COSTS								
LED MODULE DESCRIPTION	LED	LED	LED	LED	LED	LED	LED	LED
Choose Method of Relamp	SPOT	SPOT	SPOT	SPOT	SPOT	SPOT	SPOT	SPOT
Site Fee (If applicable; flat charge per site relamping)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
LED Lamp Module Cost Per Fixture (mtrl)	$ 108.00	$ 98.00	$ 108.00	$ 160.00	$ 160.00	$ 160.00	$ 98.00	$ 100.00
Labor Cost Per Fixture (labor, rental)	$ 270.00	$ 270.00	$ 270.00	$ 270.00	$ 270.00	$ 270.00	$ 270.00	$ 270.00
Recycle Fee Per Lamp (If Applicable)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total Lamp Module Replacement Cost (Per Fixture)	$ 378.00	$ 368.00	$ 378.00	$ 430.00	$ 430.00	$ 430.00	$ 368.00	$ 370.00
Rated Life (hours)	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000
Useful Life LED Systems (Years)	17.3	17.3	17.3	17.3	17.3	17.3	17.3	17.3
DRIVER	Advance	Advance	Advance	Advance	Advance	Advance	Advance	Advance
Driver Cost Per Fixture (mtrl)	$ 184.78	$ 108.78	$ 184.78	$ 264.00	$ 264.00	$ 264.00	$ 108.78	$ 184.78
Labor Cost Per Fixture (labor, rental)	$ 22.00	$ 22.00	$ 22.00	$ 22.00	$ 22.00	$ 22.00	$ 22.00	$ 22.00
Total Driver Replacement Cost (Per Fixture)	$ 206.78	$ 130.78	$ 206.78	$ 286.00	$ 286.00	$ 286.00	$ 130.78	$ 206.78
Ballast / Driver Type	ELECTRONIC	ELECTRONIC	ELECTRONIC	ELECTRONIC	ELECTRONIC	ELECTRONIC	ELECTRONIC	ELECTRONIC
Rated Driver Life (hours)	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000
ANNUALIZED LED COST SUMMARY								
Total LED System Cost	$ 1,204,119	$ 547,502	$ 514,805	$ 1,082,933	$ 124,271	$ 177,530	$ 8,691	$ 17,403
Annual LED Energy Cost	$ 9,246	$ 3,004	$ 3,953	$ 14,433	$ 1,656	$ 2,366	$ 48	$ 163
Annual LED Maintenance Cost	$ 1,141	$ -	$ -	$ -	$ -	$ -	$ -	$ -

County Installed and Maintained Solar LED Lighting Option

The County-Owned Light and Pole (and maintained) Solar LED option was calculated in a similar method of a 1:1 replacement. Per the Solar LED manufacturer, a minimum of 25% more lights/poles will be required and the pole heights will be lower than the current traditional GRU lighting (at 20'and up to 22'). Solar Electric Power Company (SEPCO) was contacted to provide a "quote" for their system. The per system pricing cost covers everything including a pole for an average budget number to use. This includes pole, anchors, template, solar, brackets, battery, controller, fixture.

Estimated Life Cycles from SEPCO Solar Components	
Component	Life Cycle
Solar Panel	30 years
SEPCO Automated Logic Controller (ALC)/ Maximum Point Power Tracker (MPPT)	15 years
Sealed Gel Battery	5-7 years
SEPCO Light fixtures (Hubble Brands Partner)	15 years
Mounts and Hardware	30 years
SEPCO DC/AC Inverters & DC/DC Converters	15 years

Installation costs can be anywhere from $500 to $12,000 per pole. Installation cost of $10,000 was used for this study (Figure 4). It is important to note that SEPCO uses Gel Cell batteries which can

be an issue with premature failures in hot environments and require lower voltage to recharge, so it takes a longer charge time. With these lead acid type batteries, every additional 15 F° above the optimal temperature (77 F°) reduces the battery life by 50%. Our team's projection is the batteries would likely need replacement every 2 years versus the stated 5-7 years from SEPCO.

Figure 4- Estimate of the costs for County -installed and owned Solar LED fixtures

	LED							
LUMINAIRE DEFINITION	1	2	3	4	5	6	7	8
Fixture Brand	**Sepco Solar**	**L39**	**L40**	**L41**	**L41**	**L41**	**L39**	**L51**
Fixture Model	Cutoff Street Light Solar	Cutoff Street Light Solar	Cutoff Street Light Solar	Cutoff Street Light Solar	Cutoff Street Light Solar	Cutoff Street Light Solar	Cutoff Street Light Solar	Cutoff Street Light Solar
Lamp Type	LED	LED	LED	LED	LED	LED	LED	LED
Input Watts Per Luminaire-Full Power	-	-	-	-	-	-	-	-
APPLICATION								
Fixture Quantity	165	75	70	146	16	24	2	4
Operating Hours/Day-Full Power	12	12	12	12	12	12	12	12
POWER CALCULATIONS								
Total kW	-	-	-	-	-	-	-	-
Total kW Saved	26.220	8.190	11.210	35.990	6.496	9.280	0.079	0.270
Annual Operating Hours (365 days)	4,380	4,380	4,380	4,380	4,380	4,380	4,380	4,380
Annual kWh	-	-	-	-	-	-	-	-
Annual kWh Saved	114,844	35,872	49,100	157,636	28,452	40,646	346	1,183
LUMINAIRE COSTS								
Per Luminaire Cost	$ 8,000.00	$ 8,000.00	$ 8,000.00	$ 8,000.00	$ 8,000.00	$ 8,000.00	$ 8,000.00	$ 8,000.00
Installation Cost (Per Luminaire)	$ 10,000.00	$ 10,000.00	$ 10,000.00	$ 10,000.00	$ 10,000.00	$ 10,000.00	$ 10,000.00	$ 10,000.00
Rebate Per Fixture (If Applicable)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Rebate Per kWh Saved 1st Year (If Applicable)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Rebate Per kW Saved (If Applicable)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Accelerated Tax Depreciation (%)	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Accelerated Tax Depreciation Savings	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
EPAct Tax Deduction	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Combined 1st Year Cost Offset (Rebate + Tax Benefit)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
LED MAINTENANCE COSTS								
LED MODULE DESCRIPTION	LED	LED	LED	LED	LED	LED	LED	LED
Choose Method of Relamp	**SPOT**	**SPOT**	**SPOT**	**SPOT**	**SPOT**	**SPOT**	**SPOT**	**SPOT**
Site Fee (If applicable; flat charge per site relamping)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
LED Lamp Module Cost Per Fixture (mtrl)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Labor Cost Per Fixture (labor, rental)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Recycle Fee Per Lamp (If Applicable)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total Lamp Module Replacement Cost (Per Fixture)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Rated Life (hours)	86,700	86,700	86,700	86,700	86,700	86,700	86,700	86,700
Useful Life LED Systems (Years)	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0
DRIVER	Advance	Advance	Advance	Advance	Advance	Advance	Advance	Advance
Driver Cost Per Fixture (mtrl)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Labor Cost Per Fixture (labor, rental)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total Driver Replacement Cost (Per Fixture)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Ballast / Driver Type	ELECTRONIC	ELECTRONIC	ELECTRONIC	ELECTRONIC	ELECTRONIC	ELECTRONIC	ELECTRONIC	ELECTRONIC
Rated Driver Life (hours)	86,700	86,700	86,700	86,700	86,700	86,700	86,700	86,700
ANNUALIZED LED COST SUMMARY								
Total LED System Cost	$ 2,970,000	$ 1,350,000	$ 1,260,000	$ 2,628,000	$ 288,000	$ 432,000	$ 36,000	$ 72,000
Annual LED Energy Cost	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Annual LED Maintenance Cost	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -

Further site-specific analysis should include a monthly load-profile (our hourly data log as appropriate) as appropriate by site, to understand specific variations in site utility usage, peak demand, and average use. Many sites have significant tree cover or building obstructions that will affect a solar LED installation layout design or fixture efficiency that should be further analyzed, specifically during the peak solar window of 9 AM – 3 PM. Land use on lots in urban areas can change over time and affect solar access and should be considered as part of any County project. In addition, ownership of a solar system will require regular inspections and performance monitoring; any future interconnection with another grid provider could require additional documentation of insurance and maintenance records. Finally, severe weather events must be considered in design and the maintenance of any lighting fixture to ensure operational continuity, adequate repair/replacement, and public safety (particularly parking lot lighting for any facility deemed "critical" during an emergency event).

Capitol Maintenance Considerations

Of the utmost importance to highlight is the added cost of operations and maintenance for any County installed and maintained option. Maintaining any lighting system- traditional or LED- will require a sizable asset inventory, specialized equipment, and skilled employees. Based on County staff recommendations, we anticipate the need for an Equipment Operator III position at the very least. A similar position is currently advertised on the County's employment website as of October 2019 for a salary range of $32,240 - $47,132.80 annually. This position will require a Class "A" Commercial Driver's License and the additional skill set of maintaining LED lighting systems.

Additionally, the LED maintenance program would require a boom crane truck (aka" bucket truck") for light and structure maintenance activities. Cost can be affected by the type of truck selected and the required height of the platform- heavy duty trucks as well as the required accessories (air compressor, ground protection, etc.). The estimated costs for a boom crane outfitted for telecom/electric work would be approximately $250,000. These capital costs for County employees and equipment are not included in our LED conversion estimates due to the number of unknown factors for staffing numbers, equipment inventory needs, and the number of vehicles required.

Traditional Lighting vs. GRU Installed and Maintained LEDs

DRMP estimates that converting lighting at County owned parking lots to save approximately $24,000 a year in energy usage. It is difficult to estimate the amount required for maintenance required by the County per the agreement with GRU. Adding the cost of the initial conversion (covered by GRU) and the amount of the estimated annual energy cost savings gives a starting point of over $100,00 to evaluate the annual maintenance costs at existing County LED installations and extrapolate those costs to the entire parking lot LED conversion initiative.

	GRU Owned LED	Traditional
Total Fixture Cost	$0 (cost borne by GRU)	Existing
Annual Kilowatt Hours	253,028 KwH	428,079 KwH
Average Energy Cost	$34,868	$58,990
Annual Savings	$24,122	$0

County Installed and Maintained LED Lighting Systems

Using the supplied estimate cost of $6,500 per lighting installation, the team was able to estimate a price range to remove existing GRU lighting and install new County-owned and maintained lighting. These systems would still require a GRU service meter and any associated GRU account costs (meter reading charge, fuel adjustment.). All maintenance, repair and replacement costs would be assumed by the County. The team can estimate the proposed capital costs for an LED program equipment and staff but not the annual required maintenance.

DRMP recommends additional analysis of LED light sites owned by the County for a better idea of true fixture life cycles and repair costs. The team inserted annual cost of $1,141 for estimated maintenance to illustrate the difference between GRU and County owned LED lighting costs. Additional design costs will be required where floodlights are currently installed (not included in this estimate). This costs essentially illustrates the very bottom, baseline costs of removing all GRU owned lights and installing County-owned LED lights. Even with a substantial savings in energy usage costs when compared to the traditional lighting system, the initial installation would require upwards of $3.7 million dollars for the initial installation, resulting in a payback period of over 160 years.

	GRU Owned LED	County Owned LED
Total Fixture Cost	$0 (cost borne by GRU)	$3,742,907
Annual Kilowatt Hours	253,028 KwH	253,028 KwH
Average Energy Cost	$34,868	$34,868
Annual Maintenance	$0	$1,141
Annual Savings	$24,122	$22,981

County Installed and Maintained Solar LED

Based on estimates from contractors and vendors, the DRMP estimated an $8,000 cost per solar LED fixture and an installation cost of $10,000 per fixture. Additional details must be considered when converting to solar that can increase the design cost, so these estimates are strictly an average per fixture. Prices of each component are not available to determine the cost of maintaining the lighting components and maintenance is not wholly included in our estimate. It is assumed the solar LED fixtures would not generate an energy usage cost or be tied to a GRU meter. While the energy cost and related utility billing savings would be tremendous, the overall payback period for the large installation and undetermined true design cost would exceed 160 years.

	County Owned Solar LED	County Owned LED
Total Fixture Cost	$9,036,000	$3,742,907
Annual Kilowatt Hours	0 KwH	253,028 KwH
Average Energy Cost	$0	$34,868
Annual Maintenance	$0	$1,141
Annual Savings	$58,990	$22,981

Summary

This report consolidated information from a variety of sources to provide an initial overview of potential program costs. Exact costs by specific site are not feasible to produce at this level of analysis- any recommendation provided by DRMP is intended to illustrate the major differences between each LED installation option requested by the County.

Estimates for total project costs should include feasibility, engineering and design, permits and fees, and regulatory review meetings. Additional expenses can be expected for any contractor equipment, installation, commissioning, prepaid maintenance, extended warranties, and specific site construction considerations (soils, urban vs rural site, etc). The estimated costs for a boom crane outfitted for telecom/electric work and one full-time employee would exceed $300,000.

Replacement Method	Replacement Cost	Annual Energy Savings	Payback Period
Traditional (Existing)	$0	$0	0
GRU Rental LED	$0	$24,122	0
County Owned LED	$3,742,907	$22,981	158 years
County Owned Solar LED	$9,036,000	$58,990	151 years

In summary, the study concludes and clearly demonstrates that converting the existing traditional, GRU area lighting to GRU-maintained LED lighting is the most cost-effective approach. The County will immediately recognize an offset in energy costs and avoid a long-term investment in a new maintenance program. In addition, the added considerations of installing or designing a solar LED lighting system on a large scale will require annual capital expenses for staff, equipment, and inventory that is difficult to estimate. DRMP recommends the County review facilities in rural areas that may benefit from a backup lighting system or a pilot project to further assess the use of solar LED lighting fixtures on County property.

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