Texas Water Development Board

City of Rio Hondo

CWSRF GREEN PROJECT RESERVE BUSINESS CASE EVALUATION

STATE FISCAL YEAR 2015 INTENDED USE PLAN

PROJECT NUMBER 62600

COMMITMENT DATE: December 14, 2015

DATE OF LOAN CLOSING: March 10, 2016

GREEN ESTIMATE AT CLOSING: $1,045,596

TEXAS WATER DEVELOPMENT BOARD

Green Project Reserve

Green Project Information Worksheets

Drinking Water State Revolving Fund

Intended Use Plan

The Seal appearing on this Document was authorized by Juan-Pablo Cantu, PE, #90105 on 12/08/2014

The Federal Appropriation Law for the current fiscal year Clean Water and Drinking Water State Revolving Fund programs contains the Green Project Reserve (GPR) requirement. The following Green Project Information Worksheets have been developed to assist TWDB Staff in verifying eligibility of potential GPR projects.

TWDB-0163
Revised 12/2/2010

TEXAS WATER DEVELOPMENT BOARD
DRINKING WATER STATE REVOLVING FUND (DWSRF)
GREEN PROJECT INFORMATION WORKSHEETS

PART I – GREEN PROJECT INFORMATION SUMMARY

Check all that apply and complete applicable worksheets:

Categorically Eligible

- ☐ Green Infrastructure $
- **X** Water Efficiency $ 1,150,003
- **X** Energy Efficiency $ 250,000
- ☐ Environmentally Innovative $

Business Case Eligible

- ☐ Green Infrastructure $
- **X** Water Efficiency $ 1,445,042
- **X** Energy Efficiency $ 632,500
- ☐ Environmentally Innovative $

Total Requested Green Amount $ 3,477,545

Total Requested Funding Amount $ 3,893,479

Type of Funding Requested:

- ☐ PAD (Planning, Acquisition, Design)
- **X** C (Construction)

Completed by:

Name: Juan-Pablo Cantu, P.E. Title: Project Engineer

Signature: Date: 11/07/2014

PART II - CATEGORICALLY ELIGIBLE

Complete this worksheet for projects being considered for the Green Project Reserve (GPR) as categorically eligible. Categorically eligible projects or project components are described in the following sections of the EPA GPR guidance (TWDB-0161):

Green Infrastructure	Part B, Section 1.2
Water Efficiency	Part B, Section 2.2
Energy Efficiency	Part B, Section 3.2
Environmentally Innovative	Part B, Section 4.2

Information provided on this worksheet should be of sufficient detail and should clearly demonstrate that the proposed improvements are consistent with EPA and TWDB GPR guidance for categorically eligible projects. Refer to **Information on Completing Worksheets** for additional information.

Section 1 – General Project Information

Applicant: CITY OF RIO HONDO PIF #: 10292 (PID 62600)

Project Name: WATER SYSTEM IMPROVEMENTS

Contact Name: BEN MEDINA, CITY ADMINISTRATOR

Contact Phone and e-mail: 956.748.2102/b.medina@cityofriohondo.com

Total Project Cost: $3,893,479 Green Amount: $1,400,003
(Categorically Eligible)

Brief Overall Project Description:

The proposed projects address system wide water loss and high energy consumption attributed to dilapidated distribution and transmission lines and a dilapidated water metering system, and proposes a high efficiency pumps/motors with variable frequency drives (VFDs) for the WTP high service pumps, transfer pumps and raw water pumps, and solar LED site lighting. The distribution and transmission system improvements addresses water loss, energy efficiency and reduction of the carbon footprint by utilizing a fixed radio based Automated Water Meter Reading system and replacing water lines that repeatedly break and have flow restrictions with water quality issues due to excessive pipe tuberculation, and energy efficiency upgrades at the WTP.

Section 3 – Water Efficiency

Certain water efficiency improvements may be considered categorically eligible for the GPR. Refer to EPA and TWDB GPR guidance for a complete list and description of categorically eligible GPR Projects. A few common types of water efficiency projects that may be considered categorically eligible, such as certain water meter improvements and leak detection are listed below. Complete these sections of the worksheet as applicable. For any other water efficiency improvement being considered for categorical eligibility, complete Section 3.3.

Section 3.1 - Water Meters

Check all that apply:

- ☐ Installation of new water meters in area currently receiving unmetered water service (the following must be provided)
  - ☐ Attach copy of rate structure for area to be metered
- ☒ Replacement of existing broken/malfunctioning meters (the following must be provided)
  - ☒ Accuracy of meters being replaced 75%
  - ☐ Attach supporting documentation (meter accuracy tests, etc)
  - ☒ Provide description below of proposed meters to be installed
- ☐ Retrofitting of existing meters (the following must be provided)
  - ☐ Provide description below of reason for meter retrofit
  - ☐ Provide description below of proposed meter system and benefits, including description of features that will result in water loss reduction or promote water conservation

Describe proposed water meter improvements, include reason for project, description of proposed meters and features, resulting benefits, anticipated savings, etc. (attach additional pages if necessary):

The proposed AMR system will replace 732 manual read meters with AMI water meters that provide instantaneous leak detection at each meter and leak detection for 12 zones within the potable water distribution system. The city currently experiences yearly average water loss exceeding 40% with that attributed to dilapidated water meters and water service laterals, line leaks, reservoir seepage and unaccounted for water. The excessive water loss for the city is taxing their pumping systems while also adding high energy consumption. The city must replace the aged manual water metering system (+15 yr age) with smart meters; the proposed AMR system will significantly enhance the utility's ability to identify and respond to leaks in a timely manner. The proposed AMR system can reduce the city's water losses by as much as 12%. Water meter manufacturers recommend replacement of water meters over 10 years old since they lose up to 15% accuracy.

The AMR system will not only reduce system water losses but reduce the carbon footprint associated with manually reading the water meters for collection of billing data. It will also reduce the time and resources required to locate and address leaks within the distribution system since its leak detection capabilities are state of the art and real time. Additionally, the energy cost to produce water is reduced with the reduction in water losses as the pumping systems are not activated prematurely.

Green amount associated with water meters: $1,150,003
(Attach detailed cost estimate if necessary)

Section 4 – Energy Efficiency

Certain energy efficiency improvements may be considered categorically eligible for the GPR. Refer to EPA and TWDB GPR guidance for a complete list and description of categorically eligible GPR projects. A few common types of energy efficiency projects that may be considered categorically eligible, such as renewable energy projects and NEMA Premium efficiency motors, are listed below. Complete Sections 4.1 and 4.2 if applicable. For any other energy efficiency improvement being considered for categorical eligibility, complete Section 4.3.

Section 4.1 – Renewable Energy Improvements

Renewable energy improvements such as wind, solar, geothermal, micro-electric, etc, are considered categorically eligible for the GPR according to EPA GPR guidance (TWDB-0161) Part B, Section 3.2. List renewable energy components applicable to the project in the table below. Also provide a detailed description of the proposed improvements.

Component Description	Design Life	Component Cost	Annual Energy Produced	Annual Financial Savings
Solar LED Site Lighting (4EA Site)	20	50,000	6114kWh	1671
Total:				

Provide a detailed description of the proposed improvements including location, use, connections to existing systems, proposed facility operation, calculation of anticipated savings, etc (attach additional pages if necessary):

The solar LED lighting will replace high energy consumptive high pressure sodium site light fixtures within the WTP site. The LED lighting technology will result in the following reduction of green house gases:

Cumulative Savings (lbs)			
	Carbon Dioxide (CO_2)	Nitrous Oxide (N_2O)	Methane (CH_4)
Year 1	8,334	550	306
Year 5	30,572	2,752	1,529
Year 10	61,145	5,503	3,057

** See attached LED vs. HPS energy summary sheet**

Green amount associated with renewable energy: $50,000

Section 4.2 – NEMA Premium Efficiency Motors

If NEMA Premium efficiency motors are to be used, provide total motor cost: $55,000
(attach a list of proposed motors to be installed including horsepower and efficiency rating)

Section 4.3 –Other Energy Efficiency Improvements

Complete this section for energy efficiency improvements other than those listed above. Provide reference to the applicable sections of the EPA GPR guidance (TWDB-0161) that demonstrate GPR eligibility. Provide a detailed description of the proposed energy efficiency improvements of sufficient detail that clearly demonstrates that the proposed improvements are consistent with EPA GPR guidance (TWDB-0161).

Guidance Reference:

Detailed Description (attach additional pages if necessary):

Variable frequency drives (VFDs) will be utilized with each high service pump/motor (2), transfer pumps (2) and raw water pumps (2). VFDs will reduce the speed of the motor which exponentially reduces the power input required for pumping operation, extends the life of the motor and reduces service provider demand charges or any additional surcharges for power factor because it is also reduced.

See attached electrical improvement summary and Case # scenario that will be implemented to attain the most energy savings.

Solar LED Lighting = $50,000
NEMA Premium Eff Motors = $55,000
VFDs for Pumping Systems = $145,000

= $250,000

Green amount associated with energy efficiency improvements: $250,000
(Attach detailed cost estimate if necessary)

PART III - BUSINESS CASE ELIGIBLE

Complete this worksheet for projects being considered for the Green Project Reserve (GPR) as business case eligible. Business case eligible projects or project components are described in the following sections of the EPA GPR guidance (TWDB-0161):

Green Infrastructure	Part B, Section 1.4
Water Efficiency	Part B, Section 2.4 and 2.5
Energy Efficiency	Part B, Section 3.4 and 3.5
Environmentally Innovative	Part B, Section 4.4 and 4.5

Information provided on this worksheet should be of sufficient detail and should clearly demonstrate that the proposed improvements are consistent with EPA and TWDB GPR guidance for business case eligible projects. Refer to **Information on Completing Worksheets** for additional information.

Section 1 – General Project Information

Applicant: CITY OF RIO HONDO PIF #: 10292 (PID 62600)

Project Name: Water System Improvements

Contact Name: Ben Medina, City Administrator

Contact Phone and e-mail: 956.748.2102/b.medina@cityofriohondo.com

Total Project Cost: 3,893,479 Green Amount: 2,077,542
(Business Case Eligible)

Brief Overall Project Description:
The proposed projects address system wide water loss and high energy consumption attributed to dilapidated distribution and transmission lines and a dilapidated water metering system, and proposes high efficiency pumps/motors with variable frequency drives for the high service pumps, transfer pumps, backwash pumps and raw water pumps, and solar LED site lighting at the WTP. The distribution and transmission system improvements addresses water loss, energy efficiency and reduction of the carbon footprint by utilizing a fixed radio based Automated Water Meter Reading system and replacing water lines that repeatedly break and have flow restrictions with water quality issues due to excessive pipe tuberculation, and the high efficiency pumps/ motors with VFDs address energy efficiency loss due to outdated and beyond service life equipment at the WTP.

Section 3 – Water Efficiency

Certain water efficiency improvements may be considered business case eligible for the GPR. Refer to EPA and TWDB GPR guidance for a complete list and description of business case eligible GPR Projects. For all water efficiency business case eligible projects Section 3.1 must be completed. A common water efficiency project that may be considered business case eligible is water line replacements to address water loss. For this type of project complete Section 3.2 of the worksheet. For any other water efficiency improvement being considered for business case eligibility, complete Section 3.3.

Section 3.1 - System and Water Loss Information

Section 3.1 is required for all water efficiency business case eligible projects. Attach a copy of most recent Water Audit, if available. Otherwise, complete and attach Water Audit Worksheet or provide water audit data in a similar format. Additional information on water loss and water audits as well as a copy of the Water Audit Worksheet is available at:
http://www.twdb.state.tx.us/assistance/conservation/Municipal/Water_Audit/wald.asp

Reference and attach water loss audit and/or any other completed planning or engineering studies:

- ☒ 2012 Water Loss Audit
- ☐ _____
- ☐ _____

Section 3.2 - Water Line Replacement

Proposed pipe to be replaced:

Length (LF)	Existing Pipe			Proposed Pipe	
	Material	Age (yr)	Dia. (in)	Dia. (in)	Material
6350	Asbestos/Cast Iron	50	4	6	PVC C900
7950	Asbesto/Cast Iron	50	6	8	PVC C900

Percent of distribution lines being replaced: 21.3

Number of breaks/leaks/repairs recorded in past 24 months for areas being replaced: 12

Estimated water loss from pipe being replaced (provide calculations on following page): 13.479 MG

Estimated annual water savings (provide calculations on following page): 13,479 MG

Estimated annual cost savings (provide calculations on following page): $ 63,351

Provide detailed description of the propose improvements and provide supporting calculations. Description should include a description of the methodology used to select pipes for replacement (attach additional pages if necessary):

The city's water distribution lines continue to undergo year around leaks due to the structurally deteriorated condition of the existing asbestos and cast iron pipelines. The City identified the oldest line segment areas that are continually leaking and breaking throughout the years. These lines are the ones targeted for replacement and account for approximately 21 % of the total waterlines in service to date. See calculations below for projected water and cost savings:

2012 Total Annual Water Loss = 63.283 MG
(Above items from 2012 Water Audit Report)

21.3% of Total Annual Water Loss to be replaced = 63.283 x21.3% = 13.479 MG

13.479 MG x $.0047Cnts/gal =$63,351 in water savings

Green amount associated with water line replacement: $1,445,042
(Attach detailed cost estimate if necessary)

Section 4 – Energy Efficiency

Certain energy efficiency improvements may be considered business case eligible for the GPR. Refer to EPA and TWDB GPR guidance for a complete list and description of business case eligible GPR Projects. For all energy efficiency business case eligible projects Section 4.1 must be completed. A common energy efficiency project that may be considered business case eligible is pumping facility improvements. For this type of project complete Section 4.2 of the worksheet. For any other energy efficiency improvement being considered for business case eligibility, complete Section 4.3.

Section 4.1 – System Information

Energy efficiency improvements to be considered for business case eligibility should provide reference to completed planning material such as energy assessments, energy audits, optimization studies and design level project information.

Reference Completed Planning/Design Material:

- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____

Section 4.2 – Pumping Facility Improvements

Complete for pump and motor upgrades:

Pump Description	Existing Pump			Proposed Pump		
	Pump HP	Efficiency		Pump HP	Efficiency	
		Pump/Motor	Wire to Water		Pump/Motor	Wire to Water
High Service Pumps	30	55/80	44	50	90/95	86
Raw Water Pumps	5	55/80	44	10	90/95	86
Transfer Pumps	7.5	55/80	44	15	90/95	86
Water Intake Pumps	5	55/80	44	10	90/95	86
Surface Wash Pumps	5	55/80	44	10	90/95	86
		/			/	
		/			/	
		/			/	
		/			/	
		/			/	

Total estimated energy savings from pump and motor upgrades: 97,033 kWh

Total estimated annual financial savings from pump and motor upgrades: $ 9,703.30

If NEMA Premium efficiency motors are to be used, provide total motor cost: 55,000

Total pump and motor upgrade cost: $132,500

List any other energy efficiency improvements to pumping facility (VFDs, lighting, SCADA, etc.):

Component Description	Annual Energy Savings (if known)	Annual Financial Savings (if known)	Component Cost
SCADA System for Pumping Systems		9,500	175,000
Motor Control Center		18,000	300,000
Interior WTP Bldg LED Lighting		1,500	25,000
Total:		26,000	500,000

Provide a detailed description on the following page(s) of the proposed energy efficiency improvements. Information should be specific to the equipment being proposed and calculations should be provided demonstrating substantial energy and financial savings.

Detailed Description (attach additional pages if necessary):

The project consists of the rehabilitation of the Water Treatment Plant (WTP) Electrical system. These improvements will include the purchase and installation of a new Motor Control Center, new more efficient pumps with NEMA premium efficiency motors. These pumps will now be operated by Variable frequency drives. Further, the plant control panel will be replaced by a new SCADA panel complete with an operator work station.

At present the Water treatment plant has an early Eighty's vintage Switchgear. The manufacturer of the equipment is Gould. This equipment is beyond its serviceable life and the replacement parts can no longer be purchased. As such any modifications to keep the plant running call for retrofitting of new electrical components of other brands. As such these repairs are typically major, lengthy, and costly. At present it is estimated that the City of Rio Hondo spends, on average, $18,000.00 per year on repairs. With the purchase of a new Switchgear estimated in the range of $300,000.00 installed. It is estimated that with the installation of the proposed Switchgear the annual cost for repairs will be eliminated for a minimum of 10 years. New wiring and raceways will be installed to feed all of the existing load along with any proposed new or replaced load.

Integrated in the proposed Switchgear will be Variable Frequency drives. These drives will allow the motors to be run at slower speeds to save energy. Further all motors will be replaced with newer more efficient motors that can run with VFD's. This will allow savings from efficiency and reduced input power requirements. The savings are depicted in the following cases.

Green amount associated with pumping facilities improvements: $632,500
(Attach detailed cost estimate if necessary)

Cooper Lighting by EATON

Eaton's Cooper Lighting LED Solutions
Energy & Maintenance Summary

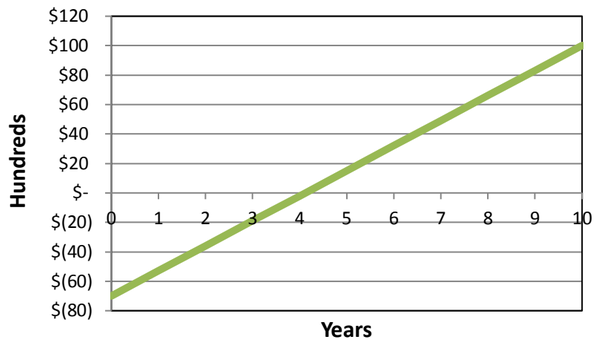
SustainabLEDesign™

Project Name:
City of Rio Hondo WTP Site Lighting

Contact:
Square E Engineering

Information:
Site Lighting: Replacing (4) - 400 Watt high pressure sodium light fixtures with (4) - 105 W LED light fixtures.

LED Payback (Years)



Payback = 4.11 Years

System Energy & Maintenance Cost Summary

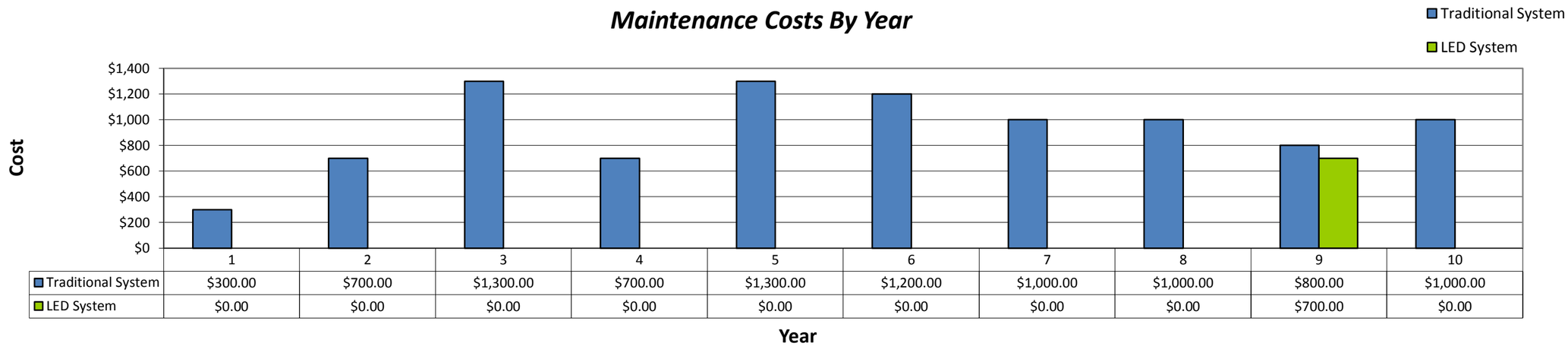
	LED	Traditional
Total Initial Fixture/Installation Cost	$48,000	$41,000
Total System kW	0.42	1.82
Annual kWh	1,840	7,954
Cost of Energy per kWh	$0.120	$0.120
kWh Inflation Rate (%/yr)	3.00%	3.00%
Average Annual Energy Cost	$253	$1,094
Average Annual Maintenance Cost	$70	$930
Average Annual Energy + Maintenance Costs	$323	$2,024
Average Annual Energy & Maintenance Savings	**$1,701**	

	Savings		Cost/Year	
	Annual	Cumulative	LED	Traditional
1st Year	$1,034	$1,034	$221	$1,254
5th Year	$1,639	$1,196	$234	$1,874
10th Year	$1,701	$10,011	$323	$2,024

	Savings
10 Year Total	**$17,011**

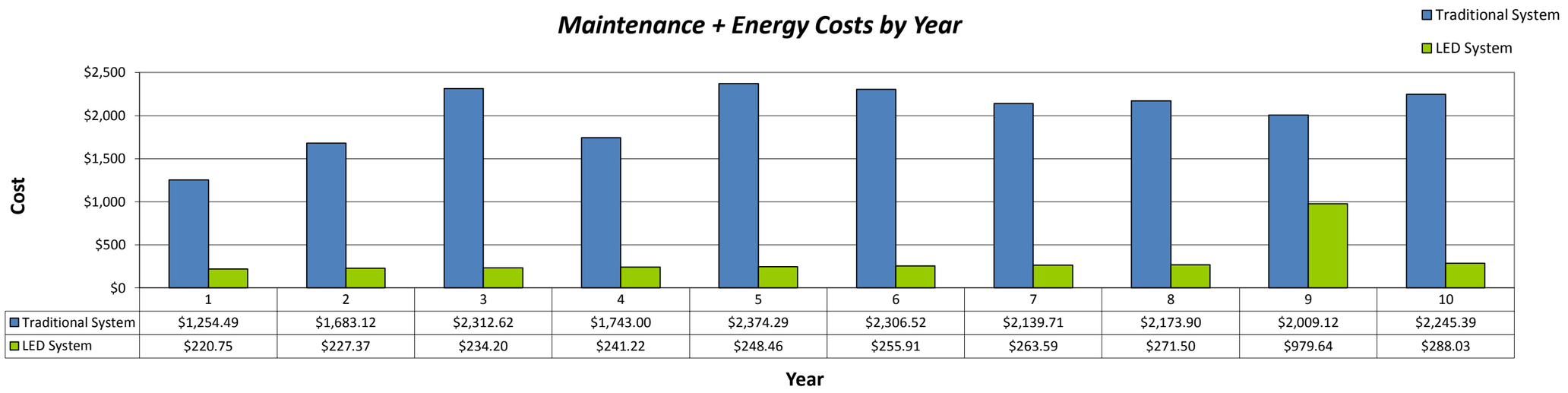
Cost	
LED	Traditional
$3,231	**$20,242**

Maintenance Costs By Year



	1	2	3	4	5	6	7	8	9	10
Traditional System	$300.00	$700.00	$1,300.00	$700.00	$1,300.00	$1,200.00	$1,000.00	$1,000.00	$800.00	$1,000.00
LED System	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$700.00	$0.00

Maintenance + Energy Costs by Year



	1	2	3	4	5	6	7	8	9	10
Traditional System	$1,254.49	$1,683.12	$2,312.62	$1,743.00	$2,374.29	$2,306.52	$2,139.71	$2,173.90	$2,009.12	$2,245.39
LED System	$220.75	$227.37	$234.20	$241.22	$248.46	$255.91	$263.59	$271.50	$979.64	$288.03

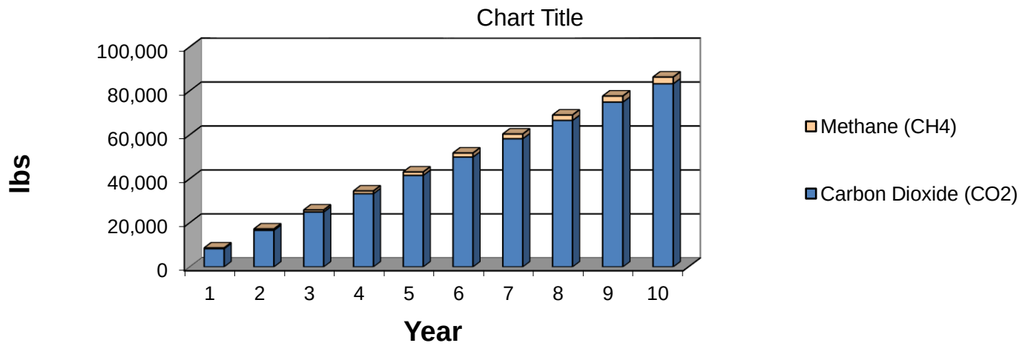
Environmental Impact

Greenhouse Gas Reduction

Reduction in greenhouse gases as a result of investing in LED lighting over traditional technology.

Cumulative Savings (lbs)

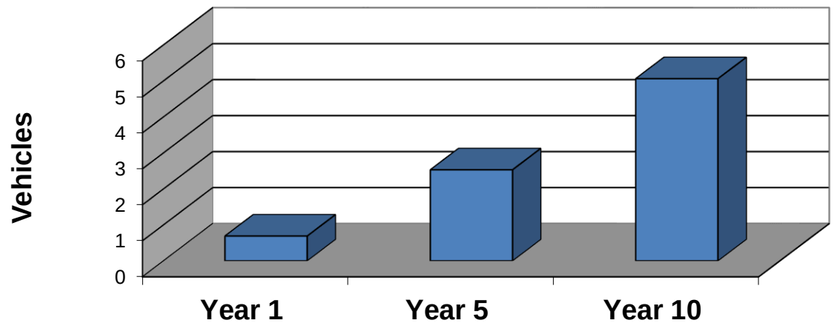
	Carbon Dioxide (CO_2)	Nitrous Oxide (N_2O)	Methane (CH_4)
Year 1	8,334	550	306
Year 5	30,572	2,752	1,529
Year 10	61,145	5,503	3,057



Equivalent Number of Vehicles (CO_2 Emissions)

Savings equivalency in fewer number of vehicles resulting from investing in LED lighting over traditional technology.

	Number of Vehicles
Year 1	1
Year 5	3
Year 10	5



Note: These are estimated savings only. Annual and monthly savings are based on a number of variables and assumptions that could change over time. The actual savings derived by your firm may be higher or lower. Eaton's Cooper Lighting business does not imply a warranty of performance or savings as calculated and shown within this program and document.

CITY OF RIO HONDO
WATER SYSTEM Electrical IMPROVEMENTS
2015 DWSRF PAD-C

The project consists of the rehabilitation of the Water Treatment Plant (WTP) Electrical system. These improvements will include the purchase and installation of a new Motor Control Center, new more efficient pumps with NEMA premium efficiency motors. These pumps will now be operated by Variable frequency drives. Further, the plant control panel will be replaced by a new SCADA panel complete with an operator work station.

At present the Water treatment plant has an early Eighty's vintage Switchgear. The manufacturer of the equipment is Gould. This equipment is beyond its serviceable life and the replacement parts can no longer be purchased. As such any modifications to keep the plant running call for retrofitting of new electrical components of other brands. As such these repairs are typically major, lengthy, and costly. At present it is estimated that the City of Rio Hondo spends, on average, $18,000.00 per year on repairs. With the purchase of a new Switchgear estimated in the range of $300,000.00 installed. It is estimated that with the installation of the proposed Switchgear the annual cost for repairs will be eliminated for a minimum of 10 years. New wiring and raceways will be installed to feed all of the existing load along with any proposed new or replaced load.

Integrated in the proposed Switchgear will be Variable Frequency drives. These drives will allow the motors to be run at slower speeds to save energy. Further all motors will be replaced with newer more efficient motors that can run with VFD's. This will allow savings from efficiency and reduced input power requirements the savings are depicted I the following cases.

CASE #1 (Existing Installation): Case #1 will show the motors as they exist at the plant right now. It is estimated that the motors will run as shown here. The HP listed for each motor is as it exists in the plant. The power factors is estimated due to age of the motors and any repairs that may have been performed on the motors.

Existing Installation			Estimated Eff	KW	Power MF	Estimated Run Time	Days	$/kW	
HSP #1	30	HP	0.8	28.09	1	14	365	0.11	$19,734.98
HSP #1	30	HP	0.8	28.09	1	14	365	0.11	$ 19,734.98
Raw Water #1	5	HP	0.8	4.681	1	5	365	0.11	$ 1174.70
Raw Water #2	5	HP	0.8	4.681	1	5	365	0.11	$ 1174.70
Transfer Pump #1	7.5	HP	0.8	7.022	1	14	365	0.11	$ 4,933.74
Transfer Pump #2	7.5	HP	0.8	7.022	1	14	365	0.11	$ 4,933.74
Surface Wash	5	HP	0.8	4.681	1	14	365	0.11	$ 3,289.16
									$ 54,976.01

As is shown in Case #1 it will cost approximately $55,000 to run these motors. This will be compared to two scenarios while running on the proposed VFD's.

CASE #2 (With VFDs running at 90%): Case #2 allows more flexibility to run the plant to provide potential savings. This case can only happen with new motors that are more efficient and slightly oversized. The VFD will allow the motors to run at 90% speed. At this slower speed the required input power to run the same motors will reduce greatly.

With VFD running at 90%			Estimated Eff	KW	Power MF	Estimated Run Time	Days	$/kW	
HSP #1	50	HP	0.95	39.42	0.73	9	365	0.11	$ 10,946.00
HSP #1	50	HP	0.95	39.42	0.73	9	365	0.11	$ 10,946.00
Raw Water #1	15	HP	0.95	11.83	0.73	3	365	0.11	$ 1,094.60
Raw Water #2	15	HP	0.95	11.83	0.73	3	365	0.11	$ 1,094.60
Transfer Pump #1	20	HP	0.95	15.77	0.73	9	365	0.11	$ 4,378.40
Transfer Pump #2	20	HP	0.95	15.77	0.73	9	365	0.11	$ 4,378.40
Surface	7.5	HP	0.95	5.913	0.73	14	365	0.11	$ 2,554.07
									$ 35,392.07

As case #2 shows a slightly oversized motor is run at 90% speed that requires only 73% input power to accomplish this operation. Further with oversized motors there is a slight reduction in estimated operating hours. This configuration will save the City approximately $20,000.00. This configuration can be used when the City needs to make more water in a short amount of time.

CASE #3 (With VFDs running at 75%): Case #3 allows more flexibility to run the plant, similar to Case #2, to provide potential savings. This case can only happen with new motors that are more efficient and slightly oversized. The VFD will allow the motors to run at 75% speeds. At this slower speeds the required input power to run the same motors will be reduced the most.

With VFD running at 75%			Estimated Eff	KW	Power MF	Estimated Run Time	Days	$/kW	
HSP #1	50	HP	0.95	39.42	0.42	15	365	0.11	$ 9,796.42
HSP #1	50	HP	0.95	39.42	0.42	15	365	0.11	$ 9,796.42
Raw Water #1	15	HP	0.95	11.83	0.42	5	365	0.11	$ 839.69
Raw Water #2	15	HP	0.95	11.83	0.42	5	365	0.11	$ 839.69
Transfer Pump #1	20	HP	0.95	15.77	0.42	15	365	0.11	$ 3,918.57

Transfer Pump #2	20	HP	0.95	15.77	0.42	15	365	0.11	$ 3,918.57
Surface	7.5	HP	0.95	5.913	0.42	14	365	0.11	$ 1,469.46
									$ 25,866.65

In this configuration it is shown that the most savings will be experienced. At 75% speed the input power to run the motor is approximately 42% or rated power. As we have oversized the motors at this slower speed the plant is estimated to run normally, but with less input power required. In this approximately $30,000.00.

With the reduction in maintenance and repairs along with the motors running at the most economical configuration. The City of Rio Hondo can pay off these improvements in just under 10 years.

Wire to Water Energy Calculator

High Service Pumps

REQUIRED DATA	PROPOSED PUMP	EXISTING PUMP
Pump Operation - Hours / Day	14	14
Pump Operation - Days / Year	365	365
Pump Flow - GPM	750	550
Pump Head - Feet	145	145
Pump Efficiency - %	90%	55%
Motor Efficiency - %	95%	80%
Energy Cost in $/KWH	$0.10	$0.10

RESULTS

BHP At Design Point	30.5	36.6
Wire to Water Efficiency - %	86%	44%
Annual Energy Cost	$12,244.12	$17,447.88
KW Per 1000 Gallons Pumped	0.532	1.035
Cost Per 1000 Gallons Pumped	$0.053	$0.103

PAYBACK

Annual Savings - $$	$5,203.75
Annual Savings - %	29.82%
Cost of Pump 1	$27,500.00
Cost of Pump 2	$15,000.00
Payback - Years	2.4

Wire to Water Energy Calculator

Intake Pumps

REQUIRED DATA	PROPOSED PUMP	EXISTING PUMP
Pump Operation - Hours / Day	14	14
Pump Operation - Days / Year	365	365
Pump Flow - GPM	700	550
Pump Head - Feet	15	15
Pump Efficiency - %	90%	55%
Motor Efficiency - %	95%	80%
Energy Cost in $/KWH	$0.10	$0.10

RESULTS

BHP At Design Point	2.9	3.8
Wire to Water Efficiency - %	86%	44%
Annual Energy Cost	$1,182.19	$1,804.95
KW Per 1000 Gallons Pumped	0.055	0.107
Cost Per 1000 Gallons Pumped	$0.006	$0.011

PAYBACK

Annual Savings - $$	$622.76
Annual Savings - %	34.50%
Cost of Pump 1	$25,000.00
Cost of Pump 2	$18,500.00
Payback - Years	10.4

Wire to Water Energy Calculator

Raw Water Pumps

REQUIRED DATA	PROPOSED PUMP	EXISTING PUMP
Pump Operation - Hours / Day	14	14
Pump Operation - Days / Year	365	365
Pump Flow - GPM	750	550
Pump Head - Feet	40	40
Pump Efficiency - %	90%	55%
Motor Efficiency - %	95%	80%
Energy Cost in $/KWH	$0.10	$0.10

RESULTS

BHP At Design Point	8.4	10.1
Wire to Water Efficiency - %	86%	44%
Annual Energy Cost	$3,377.69	$4,813.21
KW Per 1000 Gallons Pumped	0.147	0.285
Cost Per 1000 Gallons Pumped	$0.015	$0.029

PAYBACK

Annual Savings - $$	$1,435.52
Annual Savings - %	29.82%
Cost of Pump 1	$32,500.00
Cost of Pump 2	$17,500.00
Payback - Years	10.4

Wire to Water Energy Calculator — Surface Wash Pumps

REQUIRED DATA	PROPOSED PUMP	EXISTING PUMP
Pump Operation - Hours / Day	14	14
Pump Operation - Days / Year	365	365
Pump Flow - GPM	250	250
Pump Head - Feet	20	20
Pump Efficiency - %	90%	55%
Motor Efficiency - %	95%	80%
Energy Cost in $/KWH	$0.10	$0.10

RESULTS		
BHP At Design Point	1.4	2.3
Wire to Water Efficiency - %	86%	44%
Annual Energy Cost	$562.95	$1,093.91
KW Per 1000 Gallons Pumped	0.073	0.143
Cost Per 1000 Gallons Pumped	$0.007	$0.014

PAYBACK	
Annual Savings - $$	$530.96
Annual Savings - %	48.54%
Cost of Pump 1	$12,500.00
Cost of Pump 2	$7,500.00
Payback - Years	9.4

Wire to Water Energy Calculator — Transfer Pumps

REQUIRED DATA	PROPOSED PUMP	EXISTING PUMP
Pump Operation - Hours / Day	14	14
Pump Operation - Days / Year	365	365
Pump Flow - GPM	750	580
Pump Head - Feet	45	45
Pump Efficiency - %	90%	55%
Motor Efficiency - %	95%	80%
Energy Cost in $/KWH	$0.10	$0.10

RESULTS		
BHP At Design Point	9.5	12.0
Wire to Water Efficiency - %	86%	44%
Annual Energy Cost	$3,799.90	$5,710.21
KW Per 1000 Gallons Pumped	0.165	0.321
Cost Per 1000 Gallons Pumped	$0.017	$0.032

PAYBACK	
Annual Savings - $$	$1,910.31
Annual Savings - %	33.45%
Cost of Pump 1	$35,000.00
Cost of Pump 2	$16,500.00
Payback - Years	9.7