



# PERFORMANCE CONTRACTING VALUE REPORT for WEST NORRITON TOWNSHIP



Performance Period: June 2015 – May 2016.  
Presented by: Johnson Controls, Inc.  
July, 2016



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## Section 1: Executive Summary

### Introduction

In June 2014 Johnson Controls, under an agreement with West Norriton Township, began installation of various facility improvement measures (FIMs) in order to provide energy savings to the Township. Johnson Controls is pleased to present this Annual Savings Report which summarizes the results achieved by the JCI program during Year 1 of the guarantee. Among the FIMs installed were street lighting buyback from PECO, street lighting LED upgrades and exterior building lighting LED upgrades. We have also considered the additional Operation and Maintenance costs of the newly owned street lighting fixtures.

At Johnson Controls, we continuously exceed our customer's expectations by creating value-added solutions that improve our clients business and working environments. The integration of innovative finance programs with construction of capital improvements funded from operating expenses, allows revenue to be freed up for our clients to apply to their core business. For West Norriton Township, this innovative contracting approach helped fund \$1,147,839 of capital projects throughout the township which resulted in Year 1 performance period savings of \$131,099.

### Summary of Results

When Johnson Controls and West Norriton Township formed our partnership, we agreed on specific objectives by which to measure our performance on your behalf. The table below summarizes the results we have delivered:

Objective	Approach	Year 1 Guarantee	Year 1 Verified	Variance
Energy Cost Avoidance	Street Lighting Upgrades Building Lighting Upgrades	\$26,887	\$27,797	\$910
Street Light Buy Back Savings	Street Light Buyback Savings	\$105,488	\$107,757	\$2,079
Reduced Operational and Maintenance Cost	Operational and Maintenance Savings	-\$4,265	-\$4,265	\$0
<b>Year 1 Totals</b>		<b>\$128,110</b>	<b>\$131,099</b>	<b>\$2,989</b>

### Thank You

We value your business. It has been and will remain our privilege to work in partnership with West Norriton Township.



## Financial Performance

### Guarantee Project Benefits

Year	Guaranteed Utility Cost Avoidance	Street Light Buy Back Savings	Operations and Maintenance Cost Savings + Rebates	Annual Project Benefits
0	\$0	\$0	\$0	\$0
1	\$26,887	\$105,488	-\$4,265	\$128,110
2	\$27,694	\$108,653	-\$4,393	\$131,954
<b>Total</b>	<b>\$54,581</b>	<b>\$214,141</b>	<b>-\$8,658</b>	<b>\$260,064</b>

### Verified Project Benefits

Year	Guaranteed Utility Cost Avoidance	Street Light Buy Back Savings	Operations and Maintenance Cost Savings + Rebates	Annual Project Benefits
0	\$0	\$37,240	\$32,050	\$69,290
1	\$27,797	\$107,567	-\$4,265	\$131,099
2				
<b>Total</b>	<b>\$27,797</b>	<b>\$144,807</b>	<b>\$27,785</b>	<b>\$200,389</b>

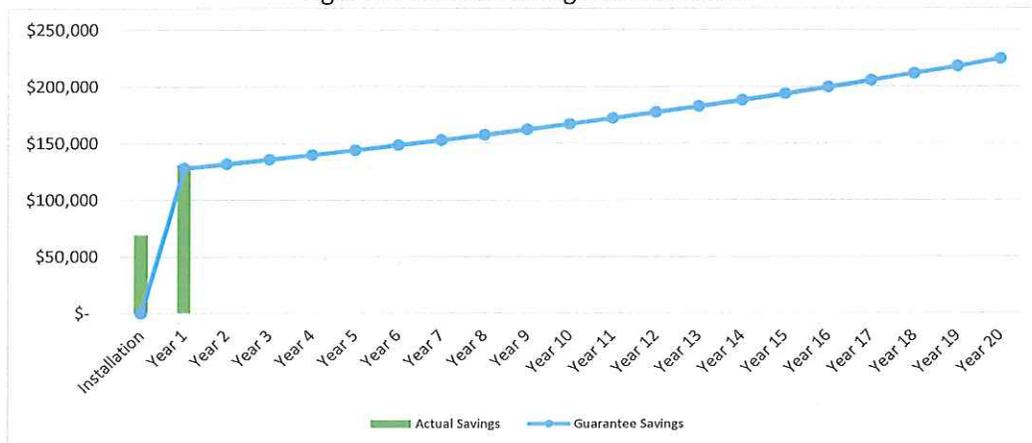
### To Date Financial Performance

Performance Year	Guarantee Benefits	Verified Benefits	Variance
0	\$0	\$69,290	\$69,290
1	\$128,110	\$131,099	\$2,989
2	-	-	-
<b>Total</b>	<b>\$128,110</b>	<b>\$200,389</b>	<b>\$72,279</b>

## Annual Verified and Guarantee Savings

The graphic below compares the project Guarantee Savings to Verified Savings, year over year.

Figure 1: Annual Savings vs Guarantee

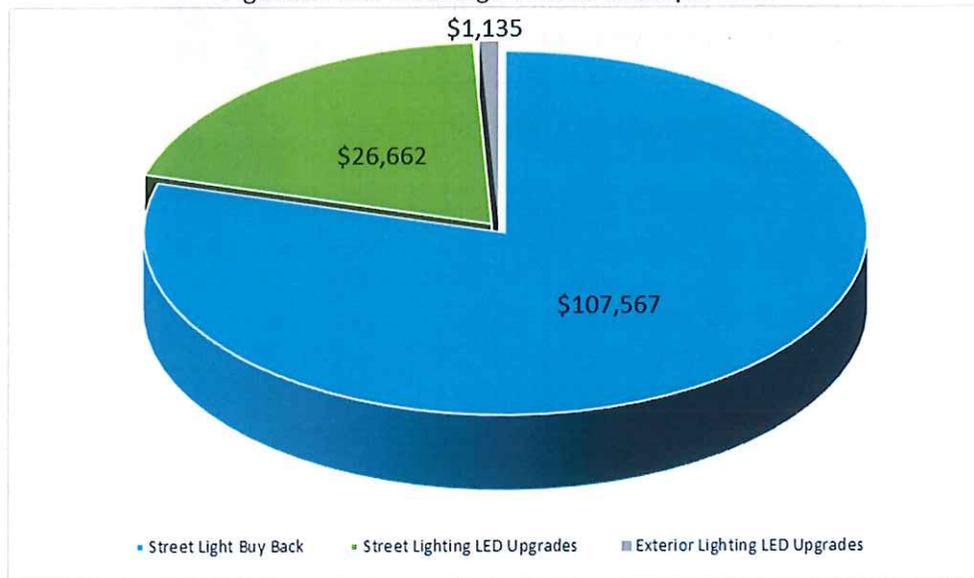




## Year 1 Performance Summary (June 2015 – May 2016)

The following figure allows us to visualize the ECMs that have a greater contribution to utility savings.

Figure 2: Year 1 Savings Broken-down per ECM



## Environmental Benefits

We invest the dollars you entrust to us mainly toward the key objectives outlined above. However, along the way, we have helped you in other meaningful way.

### Reduced Emissions

The primary human activity affecting the amount and rate of climate change is greenhouse gas emissions from the burning of fossil fuels. Reduced utility consumption yields a favorable impact in the form of reduced air emissions. During the period June 2015 to May 2016; West Norriton improvements avoided the generation of Carbon Dioxide as follows:

Approach	From Electricity
Reduced CO2 generation (tons)	264

### Approximate Yearly CO<sub>2</sub> Reduction is equivalent to<sup>1</sup>

<sup>1</sup> Based on EPA Web Site:

Reduced greenhouse gas emissions from 633,091 miles/year driven by an average passenger vehicle – or	
Reduced CO <sub>2</sub> emissions from 27.9 home's energy use for one year – or	
Carbon sequestered by 2.1 acres of US forest in one year	

<http://www.epa.gov/cleanenergy/energy-resources/calculator.html>

0.039 metric ton CO<sub>2</sub> = 1 tree planted 10 years

1 mid-sized car emits 5.1 metric ton CO<sub>2</sub>/year (Annual 20.4mpg, 11,720 miles)

12,773 kwh/house/year

## Section 3: Facility Improvement Measures

### FIM 1: Street Lighting Buyback from Utility

As a result of West Norriton Township executing the street lighting buy back contract with PECO, the tariff by which the street lighting system is charged was changed from SL-S (street lighting suburban counties) to SL-E (street lighting customer owned service). On the SL-S rate, each lamp has an annual distribution fixed charge (\$14,806 total); while the SL-E rate has a monthly rate per service location (\$7.08/location) and then bills a variable distribution charge based on energy use. The difference in rate structure allows the generation of savings, which are shown in the following table:

Table 1: Street Lighting Buyback Savings

ECM	Savings
Street Lighting Buyback	\$107,567

Additionally, after the original contract was signed with JCI, West Norriton Township has been able to purchase electricity at a lower rate (effective in the billing period starting on January 6, 2015). The commodity rate dropped from \$0.0718 in 2013 to \$0.0678 in 2016. This is an added benefit, not included in the cumulative benefits of this report. The following figures show an extract of the utility bills for the baseline period, compared to a current bill.

Figure 3: PECO bill for August 2, 2013 to September 3, 2013 – Pre Buyback



Name: WEST NORRITON TWP  
Account Number: 33134-00304

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#### Lighting Information

Size	No. of Luminaires	Wattage per Luminaire
25000S	3	294
20000M	4	429
16000S	1	192
12000M	31	275
09500S	2	131
08000M	101	191
05800S	67	94
04000M	303	115
02500L	98	202
01000L	277	103
	887	

Street Lighting Suburban Service - Current Period Detail	Service 08/02/2013 to 09/03/2013 - 32 days
Distribution Charge	14,808.47
State Tax Adjustment	-31.10
Hudson Energy Charges / 877-483-7669	
ENERGY CHARGE: 41034 KH * \$0.0718/KH	2,946.24
Sales Tax	187.85
Gross Receipts Tax	184.73
<b>Total Current Charges</b>	<b>\$18,096.19</b>

#### Highlights:

- Monthly energy use: 41,034 kWh
- Commodity rate: \$0.0718

- Distribution charge: \$14,808.47 for 887 luminaires.  
Figure 4: PECO bill for the period March 18, 2016 to April 18, 2016 – Post Buyback.

Name: WEST NORRITON TWP  
Account Number: 26430-29129

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**Lighting Information**

Size	No. of Luminaires	Wattage per Luminaire
000LED	80	35
000LED	780	36
000LED	31	49
	891	

**Street Lighting Customer Owned Service - Current Period Detail**

**Service 03/18/2016 to 04/18/2016 - 31 days**

Service Location Distribution Charge	891 Locations	X	\$7.08000	6,308.28
Distribution Charges	11,048 kWh	X	0.00953	105.29
Sales tax				384.82



Hudson Energy Charges / 877-483-7669  
ENERGY CHARGE: 11048 KH \* \$0.0677996/KH

Gross Receipts Tax				749.05
<b>Total Current Charges</b>				<b>\$7,594.41</b>

Highlights:

- Monthly energy use: 11,048 kWh (73% reduction)
- Commodity rate: \$0.0678
- Distribution charge: \$6,308.28 for 891 luminaires (57% reduction).

## FIM 2: Street Lighting LED Upgrades

This energy conservation measure (ECM) replaced existing street lighting fixtures with LED models on existing utility poles. The scope of work on the contract included replacement of 879 lighting fixtures and the inclusion of 14 new fixtures (at the Indian Trail HOA) for a total 893. Five (5) additional fixtures were identified during the implementation phase for replacement and added to the project, for a total of 898 fixtures upgraded to LED. The following table summarizes the as-built scope of work.

Table 2: Street Lighting SOW Summary

PECO Nomenclature	Existing Type	Existing Power (Watts/fixture)	Installed Power (Watts/fixture)	Qty
5800	Sodium	94	35	15
5800	Sodium	94	36	52
1000	Incandescent	103	36	276
4000	Mercury	115	35	65
4000	Mercury	115	36	237
9500	Sodium	131	36	2
8000	Mercury	191	36	100
16000	Sodium	192	49	1
2500	Incandescent	202	36	98
12000	Mercury	275	49	30
25000	Sodium	294	105	3
20000	Mercury	429	105	4
New Fixtures			36	15
<b>Total Fixtures Installed</b>				<b>898</b>

Energy savings were determined by subtracting existing to new fixture wattage per as-built line by line, then multiplying by operating hours and fixture quantity. Existing fixture watts were based on PECO Street Lighting Lumens – Wattage nomenclature; installed fixture wattage were based on manufacturer’s data; operating hours were based on PECO rate schedule (estimated to be 4,092 hours per year).

Savings are determined based on the following equations:

*Demand (kW)*

$Connected\ kW\ Saving = \sum_u [(kW/Fixture_{baseline} \times Quantity_{baseline} - kW/Fixture_{post} \times Quantity_{post})]_{t,u}$  where:

$kW/fixture_{baseline}$  = lighting baseline demand per fixture for usage group  $u$

$kW/fixture_{post}$  = lighting demand per fixture during post-installation period for usage group

$Quantity_{baseline}$  = quantity of affected fixtures before the lighting retrofit for usage group  $u$

$Quantity_{post}$  = quantity of affected fixtures after the lighting retrofit for usage group  $u$

*Energy (kWh)*

$$kWh\ Savings\ Lighting = \sum_u [Demand\ kW\ Savings_u \times Burn\ Hours]_{t,u}$$

where:

$Demand\ kW\ Savings_u$  = kilowatt savings realized during the post-installation time for usage group  $u$

$Burn\ Hours$  = number of operating hours during the time period  $t$  for the usage group  $u$

Savings determined for this ECM are as follow:

Table 3: Street Lighting Savings Summary

ECM	kWh Saved	\$ Saved
Street Lighting LED Upgrades	354,040	\$ 26,662

Figure 5: New 35-Watt LED Fixture

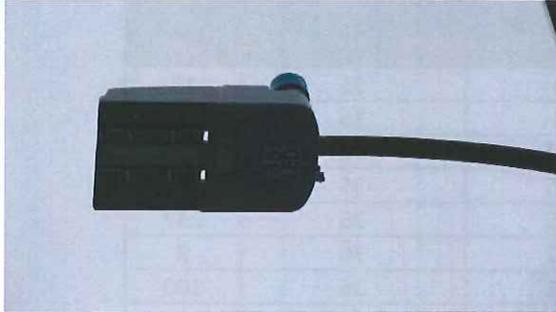


Figure 6: Acorn type street lighting fixture upgraded at Yorktown North St.



### FIM 3: Additional Exterior Lighting LED Upgrades

As part of this project, additional exterior lighting (not on roadway) was included in this project. The locations of the improvements is listed below:

- Padden Park parking lot and pavilion.
- Firehouse Recreational site
- Centennial Park, parking lot and building.
- Squire Croft Park.
- Change order at exterior and parking area of the Township Building.

There was a change in the scope for the exterior lighting upgrades, flood lights at the basketball court at the Firehouse recreation site were replaced with same fixture type. Additionally, it was agreed with the Township to add lighting upgrades on the exterior of the Township building. The final lighting line by line is presented in the following table:

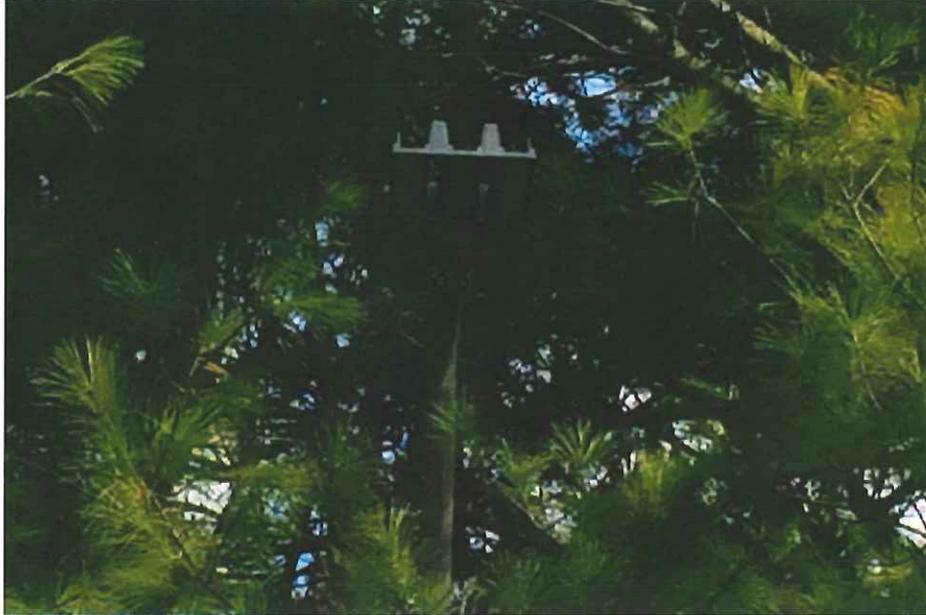
Location	Pre Fix. Qty.	Pre Watt/Fix.	Post Fix. Watt/Fix.
Padden Park, parking lot fixture	4	233	60
Padden Park, pavilion - wall pack	2	117	35
Centennial Park, garage bldg. - wall pack	2	117	35
Centennial Park, LL bldg. - wall pack	2	117	35
Squire Croft Park - pole light	1	233	60
Township Bldg. - rear main bldg.	2	400	3
Township Bldg. - side of Maintenance Bldg.	1	400	1
Township Bldg. - rear main bldg.	1	100	1
Township Bldg. - pole at side bldg.	2	250	2
Township Bldg. - pole rear lot corner	1	1000	1
Township Bldg. - rear main bldg.	1	400	1
Township Bldg. - side of Maintenance Bldg.	1	150	1
Township Bldg. - front parking	14	70	14
Township Bldg. - Police front entrance	2	100	2
Township Bldg. - Police front entrance	0	NA	8

Hours of operation for this fixtures were also estimated at 4,092 hours per year. The equations presented on FIM 2 also apply for this FIM. Savings determined for this ECM is as follows:

Table 4: New LED Fixtures

FIM	Kwh Saved	\$ Saved
Building Lighting Upgrades	15,353	\$1,135

Figure 7: New 72W LED Fixture at West Norriton parks and recreational areas.



## Operation and Maintenance Cost

As a result of the township taking ownership of the streetlight fixtures, there is an increase in the operational cost to maintain the new equipment. The cost was determined based on a third party maintenance contract starting during the first year of the project. These values were agreed upon in the contract.

Table 5: Increased Operation and Maintenance Cost

Year	Cost
1	\$(4,265)

## Recommendations

In order to realize the benefits of this energy conservation program, the energy conservation measures must remain in use as intended. The ECMs will be monitor periodically by the Performance Engineer throughout the guarantee period, but it is imperative that the operators of the systems are attentive to the systems' performance on a daily basis. Regular maintenance of equipment is also necessary to continue to realize energy savings.

We also want to remind the Township that all lighting fixtures are currently under Manufacturer's warranty, and it is not necessary to buy replacements for the fixtures upgraded at this time.

## Conclusions

- This project has successfully accomplished the upgrades of West Norriton Township street lighting infrastructure with the replacement of a total of 898 fixtures.
- The implementation of this project will reduce West Norriton Township' street lighting energy use by 73%.
- A total of \$72,279 savings have been realized since the implementation of the project; this includes the onetime benefit from Act 129 rebates from PECO.
- Exterior lighting in parks and township recreational areas, and the administration building were also upgraded.

# Appendices

## Year 1 Energy Rates

The energy rates used for calculation in this report are presented below. The greater of the escalated base rates as described in the Performance Contract and the actual rates are selected for energy savings calculations. The following table shows these values:

Table 6: Energy Rates

\$/kWh	Escalated	Actual	Effective
Street Lighting	\$0.074	\$0.068	\$0.074

## Report Delivery Verification

Year 1 Performance Summary

### West Norriton Township Energy Performance Project

I have received and reviewed the report for Year 1 period of the Performance Contract from June 2015 through May 2016. The tables and figures contained in the report support the calculations used to determine the savings numbers shown. The report also contains the agreed-upon methodology used to calculate the cost avoidance for the reporting period.

This report shows a combined utility and operations cost avoidance of \$131,099 for the Year 1 period of the Performance Contract. The Year 1 period is June 2015 through May 2016.

Please sign below to indicate your receipt of the report for the time period described above.

For West Norriton Township

Signature: \_\_\_\_\_

Printed name:

Title:

For Johnson Controls

Signature: \_\_\_\_\_

Printed name: Karla Villamizar

Title: Performance Engineer