

City of Binghamton

City of Binghamton Energy Performance Contracting: Streetlights



City of Binghamton
New York



Genesee/Finger Lakes
Regional Planning Council

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Challenges Municipalities Face

Street lighting costs the U.S.
upward of
\$8 Billion
each year



131.8 Million
people live in U.S. counties receiving an
F for ozone or particle pollution



Traffic congestion costs the U.S. economy
\$100 Billion
each year



Variation in U.S. economy associated
with weather variability is estimated at
\$485 Billion



Lighting accounts for nearly
1.9 Billion
Tons of CO₂ per year



Air pollution causes
200,000
early deaths annually
in the U.S.

Maintenance & Operations

Binghamton Project Overview




- Goals
 - Improve energy efficiency of streetlights,
 - Improve public safety, 10% of lights out
 - Reduce operations and maintenance costs,
 - Upgrade infrastructure:
 - energy conservation measures at City Hall, DPW, Water filtration plant
 - Financial performance –
 - 20 year net cash flow- \$4,952,766




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Scope Summary




- Address 6,695 locations throughout the City
 - Owned by City
- Reduce electricity consumption,
- Replace or retro-fit existing HID cobra head fixtures with new LED fixtures
- Decorative acorn and tear drop fixtures will receive new LED conversion kits.




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**Procurement Process:
Energy Performance Contracting**




A mechanism for procuring and implementing infrastructure improvements today that are self-funded over time through guaranteed operational benefits

- NYS Energy Law Article 9
- Section 103 General Municipal Law does not apply
- Design/Build
 - Owner has one point of contact
- Firm/Fixed Price, no change orders
- Self-funding
 - project benefits pay for project over time
- Lease-Purchase financing option (Section 109b General Municipal Law does not apply)




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Project Development Process



- Preliminary assessment, no cost
- City issues RFP, ESCO selected
- Detailed energy audit
 - Cost and savings identified
- Performance contract agreement assembled
- City secures project financing
- Installation
- Actual savings achieved determined



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Detailed Energy Audit



- Assemble spreadsheet detailing fixture type, wattage, GPS coordinate of each street light
- Assemble spreadsheet detailing savings
- Provide web, mobile Geographic Information Systems (GIS) and Street Lighting audit with ArcGIS file showing locations of each street light
- Physical inspection of street lights to confirm existing wattages, light source, etc. not identifiable by GIS field auditors.
- Mock-ups installed
- Data will be accessible through daily exported spreadsheets.
- Performance Contract Agreement



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Project Benefits



- A significant improvement in the street lighting quality
- Lower energy consumption and cost
- Reduced maintenance costs by installing lighting systems with longer rated service life
- Economically viable and meets customer financial requirements
- Improve public safety, eliminate outages
- Environmentally sustainable - reduced greenhouse gas emissions



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Environmental Benefits




Environmental Benefit City of Binghamton	
Energy Savings	
Annual kWh/ Watt Hours Saved	3,160,477 kWh
Annual Natural Gas Saved	0 Therms
Annual # of Gallons Saved	0 Gallons
Emission Reductions	
Pounds of Carbon Dioxide	3,071,984
Pounds of Sulfur Dioxide	9,461
Pounds of Nitrogen Oxide	4,741
Metric Tons of Carbon Dioxide	1,392
Metric Tons of Sulfur Dioxide	4
Metric Tons of Nitrogen Oxide	2
Equivalent Impact	
Passenger Cars off the Road	40
Passenger Car Miles Driven	3,812,822
Planted Acres of Trees	418
Gallons of Gasoline	160,877
Barrels of Oil	3,241
Number of Paved Homes	178




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Street Lighting Summary




- Retrofit existing fixtures with LED
- Estimated cost: \$4,000,000
- Estimated Annual Savings (year 1): \$385,434
 - Estimated Annual Energy Savings:
 - \$288,060 (66%)
 - Estimated Annual Maintenance Savings:
 - \$97,094




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Existing Streetlights




- Quantities:
 - Inventory- 7,703
 - NYSEG bill- 7,179
 - 6,695 in scope
- 2013 Bills
 - Energy- \$438,977
 - Maintenance- \$105,374
- Retrofit LED fixture
 - SC2 to SC4
 - Replace fixture, photo cell

Type	Bill Qty	Inventory Qty
70w HPS	2,308	2,190
100w HPS	2,115	2,134
150w HPS	779	763
250w HPS	1,148	1,186
400w HPS	449	451
1000w HPS	49	47
100w MV	31	500
175w MV (assume post tops)	2	32
250w MV	8	40
400w MV	21	214
235w Fluorescent	8	29
380w Fluorescent	8	18
100w MH	20	20
175w MH	3	8
250w MH	1	0
50w HPS Post Top	1	0
70w HPS Post Top	0	17
100w HPS Post Top	0	3
150w HPS Post Top	0	2
250w HPS Post Top	0	3
175w MV Post Top	0	5
400w HPS Highway Lighters	0	17
150W HPS Flood	0	4
250W HPS Flood	0	6
400W HPS Flood	0	11
250W MH Flood	0	1
Total	7,179	7,703




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Maintenance



- LED- SC4-
 - NYSEG does not offer service
 - Options
 - self perform
 - hire third party
- Estimate 75 calls per year, 1% of population
 - \$31,000 year 1, includes material and labor



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