Clean Energy Communities Program

LED STREET LIGHT CONVERSION: REGULATORY, TECHNICAL & FINANCIAL CONSIDERATIONS

August 9, 2017
## Agenda

<table>
<thead>
<tr>
<th>Introductions</th>
<th>Jamie Rogers, Clean Energy Communities Coordinator, ANCA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overview of Program</td>
<td>Pat Courtney Strong, Mid-Hudson Street Light Consortium (MHSC) and Clean Energy Communities</td>
</tr>
<tr>
<td>Economics of Owning v. Renting Street Lights</td>
<td>Amanda Mazzoni, Central NY Regional Planning and Development Board and Jen Metzger, Citizens for Local Power and MHSC</td>
</tr>
<tr>
<td>Procurement and Aggregated Purchasing Opportunities</td>
<td>George Woodbury, LightSmart Consulting LLC/MHSC and Nina Orville, Abundant Efficiency/MHSC</td>
</tr>
<tr>
<td>Technology and Design Best Practices</td>
<td>George Woodbury</td>
</tr>
<tr>
<td>The 5 Key Steps In Any Street Light Conversion</td>
<td>Pat Courtney Strong</td>
</tr>
<tr>
<td></td>
<td>Q&amp;A and Discussion</td>
</tr>
</tbody>
</table>
LED Street Lights Offer Many Benefits:

- Energy savings of up to 65 percent – and sometimes more
- GHG reductions
- Dramatically lower maintenance costs
- Improved lighting uniformity
- Enhanced pedestrian and vehicle safety
- Reduced light pollution
- Opportunity to demonstrate environmental leadership
- Capitalize on SmartCities/IOT technologies
Mid-Hudson Street Light Consortium
www.nystreetlights.org

• Funded by NYSERDA Cleaner Greener Communities through mid-2018
• Assessment: ‘LED Street Light Conversion in New York – A Common Sense Guide for Local Governments in the Mid-Hudson Region’
• Procurement Aggregation – Turnkey/Community Managed
Consortium Members

**Dutchess**
Red Hook, Tivoli

**Sullivan**
Bethel, Tusten

**Westchester**
Bedford, Bronxville, Pelham, Scarsdale

**Greene**
Catskill

**Ulster**

Esopus, Kingston, Marblemount, New Paltz, Rosendale, T/Ulster

**Orange**
Goshen, Warwick, Newburgh

**Rockland**
Orangetown, South Nyack

**Dutchess**
Red Hook, Tivoli
Clean Energy Communities Program

CNY Regional Planning and Development Board

- Community Development
- Economic Development
- Environmental Management
- Transportation Planning
- Energy Management

-Clean Energy Communities program
Clean Energy Communities Program

Filter by High Impact Action
- (All)
- Benchmarking
- Clean Energy Upgrades
- Clean Fleets
- Climate Smart Communities Certification
- Community Choice Aggregation
- Energize NY Finance
- Energy Code Enforcement Training
- LED Street Lights
- Solarize
- Unified Solar Permit

Designation Status
- Designated CEC
- Participating

Community Size
- Small Community
- Large Community
Clean Energy Communities Program

CEC Coordinators

**Capital District**
Robyn Reynolds
Capital District Regional Planning Commission
robyn@cdrpc.org

**Central New York**
Chris Carrick
Central New York Regional Planning and Development Brd
carrick@cnyrpdb.org

**Finger Lakes**
David Zorn
Genesee Finger Lakes Regional Planning Council
dave.zorn@gflrpcc.org

**Long Island**
Sarah Oral, P.E., LEED AP BD+C
Cameron Engineering
soral@cameronengineering.com

**Mid-Hudson**
Carla Castillo
Hudson Valley Regional Council
ccastillo@hudsonvalleyrc.org

**Mohawk Valley**
Daniel Sullivan
Mohawk Valley Economic Development District
cecp.mvedd@gmail.com
Clean Energy Communities Program

CEC Coordinators, continued

North Country
Jamie Rogers
Adirondack North Country Association
jrogers@adirondack.org

Southern Tier
Terry Carroll
Cornell Cooperative Extension of Tompkins County
tc629@cornell.edu

New York City
Esther Siskind
Solar One
esther@solar1.org

Western New York
for Erie and Niagara Counties
Bart Roberts
University at Buffalo Regional Institute
bjr8@buffalo.edu

for Chautauqua, Cattaraugus, and Allegany Counties
Jonathon Mayr
Southern Tier West Regional Planning and Development Board
jmayr@southerntierwest.org
(716) 945-5301 ext. 2232
Economics of Owning vs. Renting LED Street Lights

Jen Metzger, Ph.D
Amanda Mazzoni
Outside of New York City, about 74% of street lights in the state are utility-owned. Local governments pay a rental charge for each fixture, plus electricity supply and other volumetric charges.

Two possible pathways to LED streetlight conversion:

1. Upgrade to utility LEDs, where available.

2. Purchase streetlight system from the utility, and convert to LEDs. 2015 NYS legislation has made this easier.
Clean Energy Communities Program

Which LED Conversion Pathway is Best?

Consider:

• Annual costs.
• Energy savings.
• Lighting choices: Wattages, correlated color temperature (CCT), advanced control options.
• Speed of conversion.
• Convenience.
Upgrading to Utility-Owned LED Options

- LED street lights are an option you must request the utility to install.
- Towns must pay “stranded costs” of lights being replaced.
- Utility tariffs allow utilities to set pace of conversion. You can choose which of their LED sizes (watts) to install where.
Proposed NYSEG-Owned LEDs: Costs

- Stranded costs to be determined on case-by-case basis.
- Some rates higher, some lower than existing lights.
- Bill reduction of 10-15% on average after stranded costs; energy savings of 66%.

Expect PSC modifications to this proposal.
Municipal Ownership Pathway / NYSEG

• 70-75% annual bill reduction (vs. 10-15% under proposed LED tariff rate), after system purchase & LED conversion.

• Payback period on investment: 5-7 yrs (depending on utility purchase price).
Utility-Owned Pathway / National Grid

• Stranded costs to be determined on case-by-case basis.

• Energy rates lower, facility fees higher than existing lights

• Bill reduction of approximately 10-20% after stranded costs; energy savings of 70-80%
Municipal Pathway / National Grid Territory

• 75-85% annual bill reduction (vs. 10-20% under LED tariff rate), after system purchase & LED conversion.

• Payback period on investment: 5-10 yrs (depending on utility purchase price).
Moving Forward with Municipal Ownership

• Purchase of street light system is negotiated between the utility and municipality.

• With 2015 amendments to NYS Public Service Law, the purchase process has been streamlined; timeframes & requirements are set out in PSC-approved tariff rather than left wholly to utility discretion.
Purchasing the Street Light System: Basic Steps

1. Town requests purchase price estimate; utility has 90 days to respond.
2. Town notifies utility within 180 days to proceed with process.
3. Town & utility reach agreement on price/Operating Agreement
4. PSC approves sale (3-6 months.)
Purchasing the Street Light System

• Utilities use different methods to calculate the purchase price. You have a right to request the data behind the cost estimates.

• Carefully review the utility’s proposed Operating Agreement. Consult MHSC guidance document for your utility.

• Recent purchasers: Beacon, Kingston & Poughkeepsie (Central Hudson); Clarkstown, Ramapo & Orangeburg (O&R); West Seneca and Horseheads (NYSEG).
LED Street Light Conversion in New York

• A Common Sense Guide for Local Governments in the Mid-Hudson Region

➢ Benefits
➢ LED Options
➢ Ownership
➢ Procurement and Financing
➢ Comparison of Options
Procurement and Finance Options

George Woodbury
Nina Orville
MHSC Procurement and Conversion

• Aggregated Procurement Support for two forms of procurement:
  ➢ Community-Managed
  ➢ Turnkey

• Assistance for Aggregated/Collaborative Conversion (e.g. lighting design, auditing, finance options)

• Model LED Procurement RFPs

• PIGGYBACKING FOR UP TO 1 YEAR POSSIBLE
## Clean Energy Communities Program

### MHSC Aggregated Procurement Assistance

<table>
<thead>
<tr>
<th>SERVICES</th>
<th>TURNKEY PROCUREMENT</th>
<th>COMMUNITY-MANAGED PROCUREMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Full-service project management w/ broad range of services included in RFP.</td>
<td>- Most competitive pricing.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Accessible to communities w/ small number of lights that may not be able to access turnkey service</td>
</tr>
<tr>
<td>Billing &amp; field audit</td>
<td>Option in RFP</td>
<td>MHSC guidance re: how to conduct billing and field audit</td>
</tr>
<tr>
<td>Lighting design</td>
<td>Option in RFP</td>
<td>MHSC guidance</td>
</tr>
<tr>
<td>Labor procurement</td>
<td>Included in RFP</td>
<td>Included in RFP</td>
</tr>
<tr>
<td>Equipment &amp; materials</td>
<td>Included in RFP</td>
<td>Municipality procures equipment using state bid w/ guidance from MHSC. MHSC can also provide resources for municipalities to issue RFP for equipment (e.g. DOE specifications).</td>
</tr>
<tr>
<td>Project Management</td>
<td>Included in RFP</td>
<td>Municipal project oversight</td>
</tr>
<tr>
<td>Financing</td>
<td>Contractor or MHSC guidance</td>
<td>MHSC guidance</td>
</tr>
<tr>
<td>Performance Guarantee</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Maintenance Contract</td>
<td>3-year maintenance contract w/option to renew</td>
<td>3-year maintenance contract w/option to renew included in labor procurement RFP.</td>
</tr>
<tr>
<td>Other municipalities can piggyback?</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Financing Overview

• There are various options for financing streetlight conversion including:
  - Municipal Finance
  - Energy Performance Contract
  - New York Power Authority Energy Services Contract
  - Municipal Leasing

• The cost to acquire existing lights (if necessary may be bundled into any of the above financing approaches or may be funded separately by the municipality.)
Streetlight acquisition and/or conversion may be funded by a municipality through issuance of municipal debt – bonds or BANs. Considerations/Characteristics include:

- BANs are low cost and short-term.
- Bonds have low interest rate but high transaction costs.
- Impacts borrowing capacity and debt rating

Self-funding methods include use of capital funds and/or operational funds. Considerations include:

- Likely to result in incremental conversion and therefore w/o economies of scale.
- Lose opportunity to capture conversion savings more quickly.
- Many municipalities don’t have sufficient budget flexibility to accommodate.
Municipal Finance Example: Kingston

- **City of Kingston.** In October 2015 Common Council authorized bonding $2.1 million for acquisition of over 2,000 utility-owned streetlights and conversion of those plus 400+ city-owned lights to LED. The PSC approved the acquisition in March 2017 and the LED conversion procurement will be underway shortly.
Clean Energy Communities Program

Municipal Finance Example: Dobbs Ferry

Village of Dobbs Ferry. Dobbs Ferry owned its own streetlights (as do all Westchester municipalities in ConEd service territory) therefore only had to finance conversion. Two phases:

- 2011 – Cost of $104K financed via 5-year bond anticipation note. 300 LED lights purchased were installed by DPW. 3-year payback was shorter than term of financing.
- 2016 - $167K Project cost financed with capital funds ($85K balance from first LED conversion) and bond anticipation note. Project included furnishing and installation of 400 lights by vendor.
Energy Performance Contract

- Energy performance contracts (EPCs) enable projects to be financed through the savings resulting from the energy improvement project. Regulated through New York State Energy Law Article 9, key characteristics include:
  - Turnkey Service
  - Project Financing
  - Guaranteed Savings
  - May not be available for very small projects.
Clean Energy Communities Program

EPC Example: City of Yonkers

- 12,000 lights.
- RFP issued in 2012 for energy performance contract (audit, procurement, installation).
- $8.7 million project cost repaid through 10-year lease from energy savings.
- Net savings almost $1 million/year.
- Municipal GHG reduced by 10%
Clean Energy Communities Program

Tax-Exempt Municipal Lease

- Often used to finance Energy Performance Contracts, tax-exempt municipal leases may also be employed on their own. Key characteristics include:
  - Lessor provides lessee with funds to purchase equipment and lessor takes security interest.
  - Lessor is repaid through lease payments and lessee builds equity over time and owns equipment outright at end of term.
  - Structured correctly, a municipal lease does not impact borrowing capacity or credit rating or need voter or comptroller approval as it is an annual expenditure, not a debt.
Financing Considerations

- Different characteristics of financing options require careful review to determine best fit for each municipality. Considerations include:
  - Cost of financing (interest and transaction fees)
  - Municipal borrowing capacity
  - Optimal term
  - Benefits vs. cost of performance guarantee

- Collaborative procurement efforts reduce project costs (and thus the amount that must be financed to effect conversion) and may expand the range of financing options available.
NYPA LED Street Light Conversion Program

- Turnkey service – procurement, design and project management services
- Project oversight by NYPA
- Low-cost financing through a municipal lease
- Savings are equal to or greater than lease or loan payments
- Financing acquisition of existing street lights can be included in project.
Clean Energy Communities Program

NYPA Contact Info

Joseph A. Crimi, P.E. PMP
Senior Program Manager, WNY

New York Power Authority
535 Washington Street – Suite 202
Buffalo, NY 14203
(716) 842-3210
joseph.crimi@nypa.gov
www.nypa.gov

Casey Mastro
Energy Manager, CNY

New York Power Authority
288 Harford Rd.
Brooktondale, NY 14817
(716) 475-3226
casey.mastro@nypa.gov
www.nypa.gov

Jesse Scott
Municipal Program Manager – Five Cities Program

New York Power Authority
123 Main St
White Plains, NY 10601
(914) 390-8107 (office) I (914) 265-0674 (cell)
jesse.scott@nypa.gov
www.nypa.gov

Jeff Laino
Energy Manager, Long Island

New York Power Authority
123 Main St
White Plains, NY 10601
(914) 287-3351 (office) I (914) 312-1260 (cell)
jeff.laino@nypa.gov
www.nypa.gov

Nate Anctil
Customer Business Development Manager

New York Power Authority
30 S. Pearl Street
Albany, NY 12207
(518) 433-6761 (office) I (518) 817-1421
nathan.anctil@nypa.gov
www.nypa.gov
Technology Considerations

George Woodbury
Getting from Here to There

- Understanding What You Have
- Conversion Design
- Controls or Not
Field Audit

- Verification of Inventory
- Design Considerations
- Information to Collect

1. Wattage
2. Mast Arm
3. Mounting Height
4. Pole Number
5. Setback
6. Sidewalk
7. Pedestrian Activity
8. Pole Spacing
9. Condition
10. Adjacent Land Use
11. Roadway Width-Lanes
LED Technology

- Color Temperature - AMA
- Color Rendering
- Distribution Pattern
- Wattage
- Dimming
- Internal Adjustability
- Photocell Receptacle
- Costs
Clean Energy Communities Program

LED Replacements for Common Street Light Wattages

- Assumes an efficacy for the LEDs of at least 100 lumens per watt. The recently approved utility replacements for the 70-watt HPS (the most common fixture) range from 21-25 watts.

<table>
<thead>
<tr>
<th>Existing fixtures (watts)</th>
<th>Optimal LED replacement range (watts)</th>
</tr>
</thead>
<tbody>
<tr>
<td>50w HPS</td>
<td>20-28w</td>
</tr>
<tr>
<td>70w HPS</td>
<td>20-28w</td>
</tr>
<tr>
<td>70w MH</td>
<td>20-28w</td>
</tr>
<tr>
<td>100w HPS</td>
<td>35-42w</td>
</tr>
<tr>
<td>100w MH</td>
<td>20-28w</td>
</tr>
<tr>
<td>100w MV</td>
<td>15-28w</td>
</tr>
<tr>
<td>150w HPS</td>
<td>48-54w</td>
</tr>
<tr>
<td>175w MV</td>
<td>20-28w</td>
</tr>
<tr>
<td>175w MH</td>
<td>48-54w</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Existing fixtures (watts)</th>
<th>Optimal LED replacement range (watts)</th>
</tr>
</thead>
<tbody>
<tr>
<td>250w MV</td>
<td>25-54w</td>
</tr>
<tr>
<td>250w MH</td>
<td>90-100w</td>
</tr>
<tr>
<td>250w HPS</td>
<td>85-100w</td>
</tr>
<tr>
<td>400w MV</td>
<td>35-80w</td>
</tr>
<tr>
<td>400w MH</td>
<td>90-120w</td>
</tr>
<tr>
<td>400w HPS</td>
<td>85-120w</td>
</tr>
<tr>
<td>1000w HPS</td>
<td>85-120w</td>
</tr>
<tr>
<td>1000w MV</td>
<td>85-100w</td>
</tr>
</tbody>
</table>
Technology Recommendations


2. Lighting fixtures should include 7 pin photocell receptacles to allow for future SmartCities/IoT upgrades (must meet ANSI C136.41 standards)

3. Project must achieve a minimum of 55% kWh reduction
Clean Energy Communities Program

Controls

• Benefits

• Available Systems

• Challenges

• Costs
Clean Energy Communities Program

Key Steps Toward LED Conversion

• Request purchase price AND/OR: Determine to use utility-owned tariff

• If purchasing:
  
  - Conduct billing and field audits
  - Negotiate/Purchase/Notify Public Service Commission
  - Join procurement/installation/maintenance aggregation if desired /available
    - Community Managed OR Turnkey
  - Choose finance method
  - OR: As a single municipality, hire contractor(s)
Resources

• www.NYStreetLights.org

• Billing Audit:
  - Computel-Consultants.com
  - TroyBanks.com

• NYPA.com
Resources, continued

Technology/Regulatory/Finance:

Building Technologies Office/Office of Energy Efficiency and Renewable Energy

LED Street Light Conversion in New York: A Common Sense Guide for Local Governments in the Mid-Hudson Region (NYSERDA/Mid-Hudson Street Light Consortium, Release date: Q4 2017) by Jen Metzger, PhD

Health:

• ‘An Investigation of LED Street Lighting’s Impact on Sky Glow’ / April 2017
• ‘Street Lighting and Blue Light – Frequently Asked Questions’ / February 2017
Clean Energy Communities Program

Cost example

An Orange & Rockland Utilities cost example:

- Documented: Two communities paid approx. $165 per existing light, in buyout.
- All-in cost for new LED fixture up to $360, in ‘turnkey’ project. 30% less for community-managed project ($250).
- O&R is the only utility in region that doesn't charge a pole rental fee.
- 1,000-light conversion would cost approx. $165,000 + $360,000 = $525,000
- Payback periods vary but are up to 3 years.

• AFTER PURCHASE, ADD’L SAVINGS: High pressure sodium and mercury vapor streetlights cost up to $4.00/each per month to maintain. This is passed onto ratepayers under the rental model. Expect to pay approx. **$0.50/each** per month for maintenance of LED lights, as owners.
Tech support

• To attend by phone: 415/655-0002

• Morning Event Number (access code): 668 828 753

• Afternoon Event Number (access code): 666 778 980

• Webex Tech Support: 866/229-3239

• Courtney Strong Tech Support: 914/329-7917 or melissa.herreria@courtneystrong.com