

Chapter 6: Converting to LED Street Lights: Getting Started

While the benefits of LED street lighting are substantial from a financial, environmental, and community perspective, communities whose lights are owned by the utility have been challenged to move forward because they lack information about the pathways to an LED conversion. To help fill this gap, this report has explained the options available to local governments for upgrading to LED street lights, and has described and assessed the costs and advantages of different ownership models and financial strategies. This final chapter suggests steps for implementing an LED street light project, integrating findings of this study along the way.

Form a team

The first step is to form a team to develop a plan for street light conversion and make recommendations to the municipality's governing body. This could be a small team or a larger committee, and could include Department of Public Works or Highway Department personnel, elected officials, Conservation Advisory Council members, and community stakeholders and/or community volunteers with expertise or interest in energy efficiency. This team will gather information about the community's street lights, assess the most appropriate pathway forward for LED conversion, and develop a plan of action. The team may also review documents related to the purchase of the street light system from the utility, and assist with RFP development for the procurement of LED street lights, if the municipality chooses this pathway to conversion.

Join the Mid-Hudson Street Light Consortium

The Mid-Hudson Street Light Consortium is a two-year project (2016-2018) funded by NYSERDA's Cleaner Greener Communities Program. The Consortium provides no-cost support to municipalities to help them understand their street light conversion options and negotiate the outcome they seek. Benefits of membership include:

- Procurement support, including model RFPs that address furnishing the lights, installation, and maintenance;
- Facilitation of an aggregated purchase to capture volume discounts for interested municipalities;
- Information and analysis of street light buyout terms being offered by Central Hudson, Orange & Rockland, and NYSEG; and
- Continuous knowledge-sharing via webinars, workshops, and a conference, and provision of expert advice on utility regulations, tariffs, and rates.

Local governments can also receive technical assistance on street light conversions from their regional NYSERDA Clean Energy Communities Coordinator.

Undertake a billing audit

Before taking any actions to convert to LED street lights, it is recommended that the municipality undertake a street light billing audit to correct any past billing errors and secure a refund for over-charges, if a refund is due. Because of the age of the lights and record-keeping errors by utilities, over-charges are not uncommon. Billing audits have resulted in refunds to individual municipalities in the Mid-Hudson region of as much as \$100,000 from NYSEG, \$75,000 from Central Hudson, and nearly \$25,000 from O&R.¹ Some consultants undertake the audit on a commission basis (taking a percentage of any over-charges that were discovered), with no out-of-pocket cost to municipalities.

Request a street light inventory from your utility

The utility will provide an inventory of the community's lights, upon request, and may also be able to provide a map of the street lights. (If a billing audit found errors in utility lighting records, ask for a revised inventory to reflect audit findings.) The inventory contains information on the light type, wattage, and location of each of fixture, and indicates whether the light is utility-owned or municipally-owned. This information will enhance the municipal team's understanding of its street light system, and will be needed if a lighting assessment is undertaken. The information is also necessary to assess acquisition and/or conversion costs of the street lights.² Request the inventory in a format, such as Excel, that is readily adaptable to other uses, such as performing audits or preparing an LED replacement plan.

Perform a lighting assessment

A lighting assessment allows the community to eliminate unnecessary lights and to develop an LED conversion plan that ensures uniformity in lighting and light levels appropriate to street light locations. There are different ways to do a street light assessment, which are described below. A municipality may want to limit the assessment to evaluating opportunities to reduce the number of street lights, or it may want to undertake a more in-depth field audit to inform an LED lighting design plan. A decision about how to proceed with an assessment will depend upon available resources, the number of lights, and how quickly a municipality wishes to move forward with an LED conversion. Some aspects of the lighting assessment may be undertaken in-house; others can be contracted out or rolled into services provided through a turnkey retrofit project. Whether local governments choose to convert to utility-owned or municipally-owned lights, a municipal lighting assessment will ensure that the right decisions are made when selecting LED replacements for existing lights.

Below is a description of the different levels of assessment a municipality might consider, and the benefits of each.

¹ Email communication with David Rose, Principal, Computel Consultants.

² If an earlier billing audit identified mistakes in the inventory, be sure to request an updated inventory.

Needs Assessment:

A community may wish to verify that existing lights are actually needed and/or determine if there are locations where additional lights might be necessary. In rural communities, the opportunities to reduce unnecessary lighting are likely greater. When undertaking a needs assessment, it is important to use clear criteria for evaluating the lights in the field and determining whether a light can be taken out of service. Typical reasons to maintain street lights are to:

- Illuminate roads and/or sidewalks within a business district, on a Main Street, at a town attraction or center, or in residential neighborhoods;
- Improve safety in pedestrian-vehicle conflict areas;
- Improve traffic safety at an intersection, sharp curve, or area with poor line-of-sight, or on roadways with heavy traffic volumes.

Typical reasons municipalities may take a light out of service:

- Original reason for light no longer exists (e.g., town offices move, a school closes);
- Located on a road with low pedestrian activity and light traffic;
- Located on a road with low residential density.

For communities with a fairly small number of lights (under 300) a needs assessment may be performed by the team developing the street light conversion plan, or by municipal staff or volunteers. The Town of Rosendale, in Ulster County, eliminated nearly 10 percent of its street lights based on the findings of a needs assessment undertaken by the Town's Environmental Commission that were then reviewed by the town police and highway departments. In Vermont, the Town of Thetford eliminated 25 percent of its street lights as a result of a needs assessment.³ As an alternative to doing this in house, a municipality could specify a needs assessment in an RFP for a turnkey LED retrofit project.

If a local government is planning to upgrade to utility-owned lights and does not intend to undertake a more detailed GPS audit, as described below, then its needs assessment should also note areas where existing street lighting is inconsistent (i.e., multiple street light types and wattages on the same street), as well as areas where lighting levels could be higher or lower depending on local conditions. If existing lights are over-sized (or under-sized) for the location, the problem should be corrected rather than replicated when selecting from among the utility's choice of LED wattages. (See Appendix A for links to resources on conducting a street light assessment).

Lighting audit:

³ : Efficiency Vermont, *Improving Efficiency in Municipal Street and Public Space Lighting*, n.d., p. 5.

If the municipality is considering purchasing its street light system and converting to LEDs, it might consider a GIS audit to determine whether existing lighting is uniform and light levels are appropriate to the needs of the location, as well as the condition of existing equipment. The information collected in the audit will inform the LED lighting design plan, and may be important to negotiating a purchase price with the utility for the street light system. The audit will also aid in asset management and project management during the conversion. If requesting a utility upgrade, a municipal lighting plan will be used to select which of the utility's available LED wattages to install at each location.

It is important to keep in mind that LED lights, as semi-conductors, are a fundamentally different technology from the lights they are replacing, with better directionality, much greater efficiency, and superior optics. LED replacements must be properly sized, in terms of wattage, to avoid complaints about brightness—especially given that most of the lights they are replacing will have dimmed significantly with age. Proper sizing will also ensure maximum energy and cost savings, in addition to greater public satisfaction. A lighting audit can help ensure that LED replacement wattages are appropriate, and can contribute to a more uniform lighting pattern in the community.

A field audit records information about each street light and its location, which can then be used to develop an LED lighting plan. The information collected typically includes:

- Field verification of light type and wattage;
- Type of roadway (local, collector, arterial);
- Zoning (business vs. residential neighborhood);
- Pedestrian traffic (heavy, medium, light);
- Length of street light armature (how far does it extend the light into the road);
- Pole spacing and distance from the street;
- Condition of equipment (existing fixture and armature);
- Need for sidewalk illumination;
- Traffic safety conditions (location at an intersection, sharp curve; incidence of traffic accidents at the location).

During the field evaluation, the coordinates of each light can be recorded with a Global Positioning Device (GPS) and a GIS map can be created that will enable municipalities (or their contractors) to more efficiently operate and manage their street light system once they have converted, and more quickly address any outage or other problem.

Lighting audits are typically contracted out to a professional. Alternatively, the field data could be collected by municipal staff or volunteers, and then provided to a professional to develop a light design plan. (See Appendix A for resources on conducting a street light assessment, including a GPS audit, in-house.) The whole service could also be folded into a turnkey retrofit project, but it is important that the municipality clearly specify its expectations and requirements for the audit in the RFP.

Decommission any unnecessary lights

If a needs assessment has identified street lights that could potentially be taken out of service, it is recommended that: 1) residents living near the lights are notified and given an opportunity to express their views; and 2) the local police department and/or highway department review the lights to ensure that they are not needed for reasons of public or traffic safety. Once the list of lights has been vetted, reviewed, and finalized, the Municipal Board can adopt a resolution formally requesting that the utility remove the lights from service. If a municipality is considering purchase of the street light system, it may be less costly to decommission lights after their purchase, depending on whether or not the utility charges for removing the lights from service. Under the current tariffs, the utilities have different policies regarding charges for removal:

- Central Hudson will remove the lights free of charge, upon request (municipal customers are already paying for this service as part of their rates).
- O&R will charge the municipality for the difference between the minimum charge per light and the amount actually paid, if the fixture is less than five years old.
- NYSEG charges for the remaining book value of the fixtures being taken out of service, net salvage value.⁴

Choose a conversion pathway: utility vs. municipal ownership

I. The Utility Pathway in Brief

A municipality can choose to take advantage of utility LED options or purchase the street light system from the utility and then upgrade to LEDs. All Mid-Hudson utilities now offer LED upgrades upon request. Each utility's LED choices, rates, and replacement plans are very different from one to another, and it is important for municipalities to understand their particular utility's tariff and evaluate whether it meets municipal and community needs. To assist local governments, Chapters 2 and 5 have reviewed and assessed utility LED options in the three service territories. (Links to the utility tariffs can be found in Appendix A.) In all cases municipalities will see a reduction in their street light bills by converting to utility LEDs, once they pay the utility for the stranded costs (remaining book value) of the existing lights being replaced. To convert to utility LEDs, local governments will need to undertake a lighting assessment to inform the selection of LED fixture and wattage options to replace existing lights.

⁴ Central Hudson Gas & Electric Corporation, Service Classification No. 8 (Public Street Lighting), "Special Provisions," 8.2: Leaf 223 (effective date August 13, 2015); Orange and Rockland Utilities, Inc. Service Classification No. 4 (Company-Owned Lights), "Special Provisions," subsection G: Leaf 288 (effective date April 1, 2012); New York State Electric & Gas Corporation, Service Classification No. 3 (Standard Street Lighting Service), "Term": Leaf 60 (effective date January 1, 2007).

Below are some of the main takeaways from earlier chapters on each utility's LED street light program:

In Central Hudson territory, the LED rates are, with one exception, lower than for the lights they are replacing. In order to upgrade to utility-owned LEDs, municipal customers will have to pay a one-time charge for the remaining undepreciated value of existing lights (\$152.00 in 2017). This cost can be paid off on the utility bill through energy savings over a maximum period of five years. A full conversion to LEDs by Central Hudson may take less than a year to seven years, depending on the agreement reached between the municipality and the utility.

Correlated Color Temperature (CCT): 3,000 and 4,000 Kelvin options

Energy Savings Potential: Most but not all LED wattages within optimal efficiency range; total possible energy savings of up to 75 percent.

In O&R territory, the rates are lower for the LEDs than the rates for the lights they are replacing. Energy savings from LED conversion will depend greatly on which wattage options are selected from among those offered by the utility. To convert to LEDs, municipalities have to pay a one-time cost for the remaining book value of existing lights, which was \$165 per light in 2017. O&R will convert a maximum of 20 percent of the lights in the service territory per year.

CCT: 4,000 Kelvin

Energy Savings Potential: All LED wattages within optimal efficiency range; total possible energy savings of 62–81 percent.

In NYSEG territory, the rates for LED options are mostly lower than the rates for existing lights, and when combined with cost savings from conversion to more efficient LEDs, municipalities could see a nearly 50 percent reduction in their street lighting bills once they have paid a charge for the stranded costs of the lights being replaced.

CCT: 3,000 and 4,000 Kelvin options

Energy Savings Potential: total possible energy savings of up to 71 percent.

II. The Municipal Pathway in Brief:

As shown in the cost analysis in Chapter 5, in Central Hudson and O&R territories, local governments would realize even greater financial savings from taking over ownership of street lights and converting to LEDs is, even after taking into account maintenance and other costs. In NYSEG territory, the potential for savings from municipal ownership is highly dependent on the price for purchasing the system from the utility.

In Central Hudson territory, municipalities would see a cumulative financial savings of 50 to 60 percent relative to no conversion once they have purchased the street light system and installed LEDs, or 30 to 50 percent relative to converting to utility-owned LEDs. The payback period for purchasing the street lights and upgrading to LEDs is four to five years.

Municipalities could see a reduction in street lighting bills in Year 2, depending on how the project is financed.

In O&R territory, municipalities would see a cumulative financial savings of 60 to 75 compared to no conversion, once they have purchased the street light system and installed LEDs, or 35 to 65 percent relative to converting to utility-owned LEDs. The payback period on this investment would be three to five years. A significant reduction in street light bills could begin in Year 1, depending on how the project is financed. If appropriate utility LED wattages are proactively selected by the municipality, the energy savings under utility ownership and municipal ownership scenarios are both around 80 percent.

In NYSEG territory, savings to municipalities from purchasing their street light system and converting to LEDs are highly dependent on the system purchase price assessed by NYSEG. Prices for recent and pending sales have ranged more than fourfold on a per fixture basis. The payback period for the investment is about four to eleven years, based on this range. Municipal ownership could yield up to 25 percent additional long term cost savings over utility ownership if system purchases prices and other upfront costs are near the low end of the ranges assessed in this report. But at the high end, municipal ownership could end up costing up to 50 percent more on a long term basis than converting to utility-owned LEDs

The findings of this report's cost analysis lend further support to a 2008 NYS Office of the Comptroller study suggesting that purchase of the street light system can be a financial win for local governments. The biggest cost of utility-owned street lighting is the "rent" or annual fixture charges and not the delivery and supply costs. With municipal ownership, communities also gain greater control over the LED conversion process and the choice of fixtures, and can implement a lighting design plan that is appropriate to community needs and results in additional energy and financial savings.

With ownership comes responsibility, and local governments must weigh the financial and other benefits of street light ownership against the risks and additional responsibilities. If the municipality pursues a turnkey project, or enters into a long-term contract for maintenance and for a call center, the demands on municipal staff time can be minimal after the LED street lights are installed, if the contract is properly constructed.⁵ The biggest risk is a non-routine event, such as a storm taking out street lights, or a car hitting a pole and knocking out a light. In addition, if the utility undertakes a higher than expected number of pole replacements, the Town would be responsible for the cost to relocate the light to the new poles. Close coordination with the utility can help avoid surprise costs. A municipality can mitigate the risk

⁵ Municipalities may opt to receive all outage calls and forward them to the service provider in order to keep track of the calls received and to keep a record of repairs. Alternatively, the municipality can arrange for the contractor to receive the calls and provide a monthly report of calls and repairs.

of non-routine expenses by dedicating a portion of its annual savings from ownership and conversion to LEDs to a street lighting reserve or contingency account. The local government could also consider liability insurance to address this risk, as the Town of Union has done at a cost of about \$1.30 per light annually.⁶

Pathway 1: Upgrade to Utility LEDs

Prior to upgrading to utility LEDs, local governments should undertake a billing audit and recoup any past over-charges for existing lights. A municipal lighting assessment should also be undertaken to determine the utility LED wattage replacements for existing lights, along with the choice of CCT, if applicable. For these assessments, the utility should be asked to provide:

- The municipality's street light inventory in an Excel format that also includes a column for the municipality to specify its choices of LED replacements;
- A map of the street lights, if available;
- the specifications of the utility LED fixtures.

Good communication with the utility will be essential for a successful upgrade to LEDs. Municipalities should ask the utility about the timeframe for the replacement plan. The slower the conversion, the longer the delay in realizing the full energy and financial savings.

Pathway 2: Purchase the street light system and upgrade to LEDs

Purchasing the street light system from the utility:

It is important that the local government's street lighting team review the utility tariff provisions and understand the procedures and requirements for the transfer of the street light system. See Appendix A for links to the relevant utility tariff provisions.

As discussed in Chapter 3, the utilities now have broadly similar procedures and requirements in place, thanks to a 2015 State law designed to facilitate the transfer of street light systems to municipalities. There are still some important differences. For instance, both O&R and NYSEG require that municipalities install in-line disconnect fuses on each pole when they take ownership of the lights, while Central Hudson has no such requirement. And while the tariff procedures are very similar, the substance of the purchase and operating agreements differ from utility to utility. As documents negotiated between the utility and the local government, they can also differ from municipality to municipality within the same utility service territory.

The steps in the process are as follows:

⁶ Office of the New York State Comptroller, *Street Lighting Cost Containment*, 2007-MR-4, January, 2008.

- The local government notifies the utility of its desire to purchase some or all of the street lights, and requests an estimated purchase price. The PSC has directed utilities to separately itemize each cost element of the proposed purchase price (e.g., book value, depreciation, etc.), and municipalities should request that this information accompany the estimate. Local governments should also consider requesting an itemized inventory of the assets to be purchased (light type/size/location, armature, etc.) and the cost of each item.
- The utility has 90 days to respond with an estimate.
- The local government must notify the utility of its intent to move forward on the purchase process within 180 days. (Agreement to move forward does not necessarily signal acceptance of the purchase price.)
- The utility presents a purchase/operating agreement to the local government for its consideration.
- Once a mutually acceptable agreement is reached and signed by the parties, the utility has up to 60 days to file the documents with the PSC for review and approval. The Commission review and approval process can take three to six months. If the original sale price was under \$100,000, the sale is automatically approved in 90 days if no action has been taken by the Commission.
- After the sale has been finalized, the local government moves to electricity delivery-only service and ceases to pay monthly fixture charges.
- In O&R and NYSEG territory, the local government must install an in-line disconnect fuse on the street lights within 24 months of the transfer of ownership.

If at any point prior to completion of a transfer agreement municipal officials believe that the utility is not negotiating in good faith or moving the process forward, the municipality has the option of filing a petition with the PSC to facilitate the process. The PSC cannot, however, compel the utility to sell the system.⁷

Procuring and Installing LED Street Lights:

As described in Chapter 4, there are several approaches to procuring and installing LED street lights. The lowest-cost approach, a **community-managed approach**, is the procurement of LED installation and maintenance services through one contract, and procurement of the required materials (e.g. fixtures and, if required, fuses) through another. A second approach is a **single contract** for the supply and installation of materials. The third and highest cost approach is a **performance-based approach** with shared or guaranteed savings.

⁷ New York State Public Service Commission, *Order Approving Tariff Amendments with Modifications*, Cases 15-E-0745, 15-E-0746, 15-E-0747, 15-E-0748, and 15-E-0749, October 14, 2016: p. 28.

Municipalities may also consider participating in a street light procurement aggregation.⁸ This approach can reduce project costs by leveraging the combined purchasing power of a group of municipalities and by reducing soft costs for individual municipalities.

Local governments may consider piggybacking on existing street light procurement contracts, as well. Contracts that allow for piggybacking can streamline the procurement process, though they may not reduce project costs to the extent that an aggregation would. In addition, depending on the age of the original contract, some new negotiation of product selection and pricing should be undertaken to ensure that the contract reflects current market prices and technological advances.

Regardless of which approach a municipality selects, confirm that the street light inventory is updated as of the date that lights are converted to ensure maximum savings. One Westchester municipality discovered that though the selected vendor was contractually obligated to update the street light inventory, this key step was omitted and therefore the promised savings were not achieved in a timely manner despite a full street light conversion.

If moving forward with municipal ownership, local governments can begin taking steps to prepare for LED conversion before and during the process of purchasing the system from the utility, which can take a number of months. If taking a turnkey approach, municipalities should conduct the RFP process prior to initiating the process of purchasing the system from the utility. If taking a community-managed approach, local governments can conduct audits, select (but not yet purchase) LED fixtures to install, and conduct the RFP process for installation and follow-on maintenance services—all in advance of the final transfer of street light ownership so that a contract with an installation contractor can be signed promptly after assuming ownership of the lights (unless, of course, the local government plans to use qualified in-house staff to convert the lights).

Financing the project:

As detailed in Chapter 4, due to the attractive risk/return profile of LED street light conversion, there are a number of ways to finance this energy upgrade. Some of the procurement options may provide access to financing (for example, the NYPA program and energy performance contracts) while others require a municipality to secure or provide financing.

Municipalities that choose to purchase their existing street lights from the utility may finance both the acquisition and the LED conversion together, or they may use different financing strategies and vehicles for the two project components. The cost to purchase the existing lights may be paid up front to the utility or municipalities may seek to negotiate with the utility to pay for the equipment over time.

⁸ The Mid-Hudson Street Light Consortium provides support for an aggregated procurement as part of its services in 2017-2018.

Street light financing options most applicable to Mid-Hudson municipalities include:

- Bonding
- Bond Anticipation Notes (BANs)
- Self-Funding
- New York Power Authority Financing
- Tax-Exempt Municipal Leases
- Other Third-Party Ownership Models

Determining the optimal procurement and financing strategy depends on the particular characteristics, priorities, and needs of each municipality. Factors to consider in assessing the optimal procurement and financing options include:

- Internal project management capacity;
- Cost of financing (consider transaction costs as well as interest rate);
- Municipal borrowing capacity and preferences;
- Value and cost of a performance guarantee.

Questions to Consider When Developing an Implementation Strategy:

Below are questions that the municipal street lighting team should consider when developing an implementation strategy for an LED conversion:

- How will the project be financed?
- Will installation of LEDs and/or on-going maintenance be done in house, or will these services be contracted out?
- Will the LEDs be procured through an aggregated purchase, or will the local government procure the lights on its own or as part of a piggybacking arrangement?
- Will a street light audit or assessment be undertaken, and who will undertake it?
- Are there particular design considerations that are important to the community that should be included in the RFP (e.g., compliance with International Dark Skies Association standards)?
- How can the public be engaged in the process and informed about the project?

- Will the municipality participate in a collaborative effort, and if so, who will be the lead on the procurement process?

The Bottom Line

A conversion to LEDs makes good fiscal sense for local governments while providing significant environmental and community benefits. The decision facing local governments is not whether to upgrade but how. Municipalities can choose to pursue utility-owned options or municipal ownership to achieve conversion, and if the latter, they have a wealth of financing and procurement options available to them. To help local governments in decision-making, this guide has identified the costs, benefits, and considerations involved in the choices before them. Ultimately, the choice that is right for an individual community will depend on its own priorities and circumstances, and the weight decision-makers give to the risks, costs and benefits. One thing, however, is certain: The sooner communities move forward, the greater will be the energy and cost savings they can realize.

