

LED Street Light Energy Efficiency Case Study

Asheville, NC

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1. Document Purpose

This document describes the Asheville, North Carolina program for installing LED street lights as an energy efficiency strategy. It was prepared by John Cleveland for the USDN Innovation Working Group, based on information provided by Maggie Ullman, Energy Coordinator for the City of Asheville. (All quotes used in this document are from Maggie Ullman.)

The purpose of the case study is to share this best practice experience with other Urban Sustainability Directors Network (USDN) members at the September, 2011 Annual Meeting in Denver Colorado.

2. Executive Summary

Innovation Description

In 2010 the City Council of Asheville adopted a goal of reducing its carbon footprint by 20% over five years (4% per year). This resolution doubled the previous target of a 10% reduction over five years. The strategy for achieving this reduction includes a broad range of carbon reduction initiatives, one of which is a program to replace all 9,000 of the City's street lights with energy efficient LED fixtures. The LED street light program accounts for one-third of the targeted 20% carbon footprint reduction for the City.

"This innovation is less about LEDs than it is about the opportunity to build a return on investment model to finance sustainability initiatives. The LED initiative just happened to be the largest project with best ROI."

Highlights of this street light LED replacement strategy include the following:

- **Utility Relationship.** The Asheville street lights are owned and operated by the regional investor-owned utility (Progress Energy Carolinas – PEC). Prior to the LED program, the utility billed the City for a flat monthly rate for maintenance, repair and energy consumption for each street light. This rate was regulated by the NC Public Utility Commission. The implementation of the LED program was made possible by the implementation of a new rate structure for street lights that allowed the City to own the LED fixtures installed on the utility owned arm and pole. The rate structure in turn provided a significant reduction in the per-light cost based on the lower level of energy used, as well as the reduced need for maintenance. The new rate structure cut the per-light monthly cost by more than 50% for streetlights with LED fixtures. The rate also detailed that the utility would be responsible for the costs of installation of the LED fixtures.
- **Green Capital Improvement Plan.** To finance many of the improvements capable of achieving a 20% carbon footprint reduction over five years, the City created a Green Capital Improvement Plan (Green CIP). The savings from each project are deposited in a capital improvements account whose funds can roll from one year to the next, these savings finance future initiatives.

The LED streetlight cost savings are managed like an internal Energy Performance Contract (EPC) relationship, similar to what is done by ESCOs, except in this case managed directly by the City. This model is also seen as an Internal Energy Savings Revolving Program. The annual savings from the LED replacements are captured and

used to both pay off the debt incurred for fixture procurement and also fund other energy saving initiatives. Over 10 years, the LED savings are expected to generate \$3.3 million in available funding above and beyond what is required to retire the installation debt.

Debt Financing and Repayment. The City authorized borrowing (in the form of a bond issuance) of \$3.6 million to implement the LED replacement program.¹ The borrowing occurs in three separate installments – one each year for three years. The amount borrowed for each year procures the LED fixtures and photocells.

The funding of the Green CIP fund required the City Council to leave the operations budget line item for street lights unchanged and authorize the allocation of the difference between that amount and what is actually required by the new LED rate structure to the Green CIP fund. The City Council authorized this internally managed energy performance contracting relationship for a minimum of 13 years (the time required to retire all the debt).

Performance Outcomes

Key performance outcomes from this innovation include the following.

Metric	Definition	Results
<i>Energy Efficiency</i>	kWh of energy saved	<ul style="list-style-type: none"> • 3,366,402 kWh annually
<i>Carbon Reduction</i>	Tons of CO2 equivalent saved	<ul style="list-style-type: none"> • Retrofitting of all 9,000 lights will save approximately 2628 tons of CO2 per year • Total carbon savings represents a 7.1% reduction in the City's carbon footprint
<i>Cost Savings</i>	Reduced cost of street light energy and maintenance	<ul style="list-style-type: none"> • Average savings is 50% of existing costs • Each retrofitted LED light saves an average of \$71 in energy costs per year • Replacement of all 9,000 fixtures will save an average of \$638,000 per year
<i>Return on Investment</i>	Payback timeframe for capital investment	<ul style="list-style-type: none"> • 5.1 year payback

13 Year Financial Summary

Total 13 year debt financing costs (principal and interest)	\$4,635,134
Total 13 year savings generated	\$7,962,121
Savings over expenses	\$3,326,987
Use of savings:	
○ LED replacement and maintenance	\$ 137,500
○ Staffing	\$2,000,000
○ Upgrading municipal diesel fleet from a 5% biodiesel blend to a 20% blend	\$ 650,000
○ Surplus Revenue to Invest in Projects	\$ 539,500

¹ The initial installation of 900 LED units was financed by \$270,000 in EECBG funding.

Critical Success Factors

- **Leadership commitment.** The LED street light program (and the other carbon reduction programs) received management support because they were part of an endorsed City Council policy.
- **A supportive policy context.** The City was able to lead the state by implementing the first project using a new utility rate after participating as a key stakeholder in rate development.
- **A sound economic model with positive returns.** The City Council endorsed the approach of savings reinvestment because the staff was able to demonstrate a reliable positive payback with detailed financial spreadsheets. Furthermore staff was able to demonstrate how this financial model provided a future funding strategy to multiple key policy initiatives that were previously unfunded.

3. Program Background

City Council Carbon Reduction Goals

The LED streetlight replacement program grew out of the City of Asheville's overall plan to reduce carbon emissions. In 2007, the City Council approved a carbon footprint reduction goal of 2% per year until an overall reduction of 80% was achieved. (At 2% per year, this would occur in 40 years, or 2047, which is close to the typical reduction goal of 80% by 2050 that many communities have endorsed.)

In 2008 the [Office of Sustainability](#) was formed to lead this effort. The first priority of the Office of Sustainability was to create the [Sustainability Management Plan \(SMP\)](#) to guide reduction efforts and prioritize opportunities. This plan was approved in 2009. The conceptual strategy for carbon reduction in the SMP is a three pronged approach: capital investment, management decision making, and creating an organization that values sustainability.

The Sustainability Management Plan was supported by input from the [Sustainability Advisory Committee on Energy and Environment \(SACEE\)](#). The SACEE consists of nine members appointed by City Council, including an ex-officio non-voting member for the electric power utility serving the City of Asheville. The term of office is three years. The Committee is supported by the Office of Sustainability. The mission of the SACEE is to support the Mayor and Asheville City Council in their charge to integrate sustainable principles related to energy and the environment into City operations and the broader community consciousness. Roles include:

- **Policy Guidance:** Provide technical assistance to the Mayor and Council on institutionalizing environmentally sustainable practices by evaluating and developing current and future policies in support of City sustainability commitments.
- **Education:** Increase awareness of matters related to energy and environmental sustainability by developing and implementing outreach and education activities aimed at changing behaviors across a diverse cross-section of the community.
- **Partnership:** Provide leadership and support in creating synergy among public and private partners in the region to maximize efforts towards a more environmentally sustainable future.

Because of success in achieving the 2% reduction in the first three years, in 2011 the City Council adopted a Strategic Operating Plan that doubled the municipal carbon reduction goal – to 4% per year, or 20% over a five year time frame.

The Green Capital Improvement Plan

To translate the 20% target into concrete action strategies, staff created a five year carbon reduction strategy with specific projects. The plan projects a 20.94% carbon footprint reduction over five years.

One element of this strategy was the creation of a **Green Capital Improvement Plan (CIP)**. The Green CIP currently consists of 6 separate projects (including the LED streetlight replacement). Other projects include HVAC upgrades, solar thermal and alternative fuel vehicles. In addition, the Green CIP includes 4 ongoing activities including: education, building maintenance, biodiesel fuel and energy management.

The table below summarizes all of the carbon reduction projects (including the Green CIP projects) and their anticipated impact.

Project List	5 Year Investment	Revenue Source	Return on Investment	Reduction %
City Hall Lighting Retrofit	\$136,000	Grant	11.3 yr	0.33%
Solar Thermal at Sta 6 & 8	\$21,000	Grant	7.8 yr	0.05%
Computer Server Virtualization	\$100,000	Grant	10.0 yr	0.16%
North Fork Treatment Plant Motor Upgrades	\$510,000	Grant	12.8 yr	1.41%
Energy Manager	\$375,000	General Fund	1.0 yr	1.80%
Phase 1: LED Streetlights	\$290,000	Grant	6.1 yr	0.79%
Clean Cities Grant 27 CNG Vehicle Retrofits	\$425,326	Grant	1.0 yr	1.14%
Civic Center HVAC Retrofits	\$130,000	Grant and CIP	26.0 yr	0.23%
Transit Bus Replacements	\$2,600,000	Grant	-	0.81%
Phase 2: LED Streetlights	\$3,031,814	Green CIP	5.1 yr	7.11%
City Hall and PW Building Automation	\$558,000	Green CIP	15.5 yr	0.98%
Solar Thermal for 10 Fire Stations	\$130,000	Green CIP	8.7 yr	0.23%
City Hall Window Replacement	\$500,000	CIP	62.5 yr	0.15%
Insulation During Roof Replacements	\$200,000	CIP	20.0 yr	0.23%
Upgrading full diesel fleet to B20	\$375,000	Green CIP	-	1.58%
Facilities Maintenance Staff	\$500,000	Green CIP	5.0 yr	1.95%
Sustainability Outreach and Education Program	\$250,000	Green CIP	5.0 yr	1.70%
Other	\$-	Green CIP		0.30%
TOTAL	\$10,132,140			20.94%

As can be seen from the list, the LED streetlight replacement program accounts for approximately one-third of the total investment and carbon reduction contemplated by the City.

The distribution of funding sources across the entire carbon reduction portfolio is as follows:

Funding Source	Amount	% of Total
Utility Savings Reinvestment	\$5,544,814	54%
Awarded Grant Funds	\$4,262,326	42%
General Fund Commitments	\$375,000	4%
Total	\$10,182,140	100%

The Green CIP operates a municipal revolving energy savings program.. The initial investment in the Green CIP is through issuing debt; however the avoided spending that results from the streetlights and energy efficiency projects is captured and used to complete the business model. Those savings are transferred from the general fund streetlight operating line item to the debt service fund, the capital reserves fund and a capital projects line item within the general fund. This financial model was designed so that the operational savings of any given year is sufficient to, at a minimum, pay for annual debt service of the Green CIP. In other years those savings support further capital investment in carbon reduction efforts. The Green CIP is 100% financed through energy savings over time.

The design and financial performance of specific projects in the Green CIP are detailed in each annual operating budget as seen below. The number of projects; funding sources; distribution of revenue; etc., may change on a year to year basis as priorities shift and new opportunities arise.

	Operations Budget					
	Year 0 (Spring 2011)	Year 1 FY 11/12	Year 2 FY 12/13	Year 3 FY 13/14	Year 4 FY 14/15	Year 5 FY 15/16
Revenue Source:						
Utility Savings		108,316	378,564	621,066	685,418	685,418
Utility Rebates					26,195	
Total Available Funds	-	108,316	378,564	621,066	711,613	685,418
Use of Funds:						
Facilities Maintenance						
B20		50,000	50,000	50,000	50,000	50,000
LED Maintenance and Replacement			12,500	12,500	12,500	12,500
Salaries and Benefits: outreach and maintenance labor		25,000	100,000	157,000	159,000	161,000
Transfer to Capital		33,316	216,064	401,566	490,113	461,918
Total Use of Funds	-	108,316	378,564	621,066	711,613	685,418

	Green Capital Improvement Budget					
	Year 0 (Spring 2011)	Year 1 FY 11/12	Year 2 FY 12/13	Year 3 FY 13/14	Year 4 FY 14/15	Year 5 FY 15/16
Revenue Source:						
Transfer from Operations						
Budget Utility Savings		33,316	216,064	401,566	490,113	461,918
Transfer in from Capital Reserves					27,815	42,270
Grant Funding	290,000					
Debt Proceeds		1,091,040	1,675,526	1,093,633		
Total Available Fund	290,000	1,124,356	1,891,590	1,495,199	517,928	504,188
Use of Funds:						
Phase 1 Grant Funding (LED)	290,000					
Led Streetlight Upgrades		1,091,040	1,675,526	405,633		
Facility Energy Improvements				688,000		
Transfer to Capital Reserves		33,316	67,137	27,912	5,091	5,440
Transfer to Debt Service fund		-	148,927	373,654	512,837	498,747
Total Use of Funds	290,000	1,124,356	1,891,590	1,495,199	517,928	504,188

	Capital Reserves					
	Year 0	Year 1 FY 11/12	Year 2 FY 12/13	Year 3 FY 13/14	Year 4 FY 14/15	Year 5 FY 15/16
Transfers In		33,316	67,137	27,912		-
Transfers out		-			27,815	42,270
Total		33,316	100,454	128,365	100,550	58,280

Green CIP Management

The Green CIP is managed by the Office of Sustainability that recently relocated from the City Manager’s office to the Finance Department. The Office of Sustainability has overall responsibility for the Sustainability Management Plan and implementing the Green CIP.

Utility Relationship and Regulatory Context

In 2006 PEC had proposed the building of a peak energy power plant in Asheville to manage peak demand periods. The citizens of Asheville mobilized politically to stop the building of the plant. In response, PEC formed a regional stakeholder group (the [Community Energy Advisory Council – CEAC](#)) to advise PEC on how best to meet the energy needs of the region, specifically the management of peak demand. Through this council the utility had the opportunity to educate their customers about technical challenges, regulatory barriers and general utility perspective. Two years of this two way conversation resulted in series of detailed recommendations from CEAC to the utility on how best to achieve these goals. Other exchanges of information took place at this Council as well including the City’s design to see a market based solution to the challenges of reducing carbon footprint for streetlights.

This successful relationship supported the utility as they developed and researched a new streetlight rates. PEC decided to pursue the current LED rate based on a projected series of events. First the portfolio of streetlights PEC owned were aging out and reaching the end of their lifespan. Faced with the need to begin upgrading their large street light portfolio the PEC lighting specialists began with product research. Convinced that LED’s are the next standard for streetlights, PEC began to run financial projections. LED’s are currently priced higher than mercury vapors, high pressure sodium or high intensity discharge lamps. To upgrade their portfolio PEC would need to finance the investment. In order to recuperate the PEC investment the basic rate for streetlights would be increased for municipalities. PEC was concerned that this creates a perverse incentive for the rate payer to choose upgrading to the utility’s preferred technology.

“There are so many layers to the utility relationship. The fact that we had been working with them for many years on many different issues made a big difference. Plus we had a ‘win/win’ situation where we both wanted the same result.”

The relationship built through the CEAC and the progressive nature of the Asheville area lead the utility to reach out to the city as a key stakeholder at this point. With the knowledge that municipalities can generally borrow money at a lower rate, PEC solicited the City’s input to see if there would be interest from the municipality to purchase the fixtures in exchange for a significantly lower rate. The City saw this incentive based model as a strong opportunity to reduce carbon footprint and communicated willingness to implement full scale if a rate was available. PEC then pursued developing the “Customer Owned LED” rate. The City reviewed and shared input on the rate before PEC solicited utility commission approval.

4. Detailed Operational Description of the LED Streetlight Replacement Program

Program Management Responsibility

The LED streetlight program is managed by the Office of Sustainability in the Finance Department.

- **SETTING UP THE REPLACEMENT SCHEDULE:** The replacement schedule is set by the Office of Sustainability through carefully balancing the speed which fixtures can be installed and thus the savings accrual from the lower rate with the total monies borrowed and therefore the debt service payment requirements.
- **MANAGING THE UTILITY RELATIONSHIP:** The Office of Sustainability is the key point of contact with the utility for this partnership. The Public Works Department serves as

the operations contact in regards to future streetlight burn outs and replacements, fixture ordering and warranties.

- **MAINTENANCE:** The Public Works Department fields the citizen calls relating to maintenance needs. Public Works then issues a work order for the utility to make a site visit to assess and tend to maintenance needs.
- **MANAGING AND TRACKING THE FINANCES:** The Office of Sustainability manages the finances, tracks the savings, initiates the spending and initiates any necessary account transfer and budget amendments. The Chief Financial Officer is responsible for debt issuance. The Budget Manager is responsible for establishing necessary accounts and budget programs.

Streetlight Rate Structure

The street lights are managed under a special LED street light rate structure – “[Street Lighting Service Schedule, SLS-17](#)”. Under this regulatory arrangement, the utility owns the street light structures (poles) and charges the customer (city) for the cost of the electricity and service/maintenance expenses. The monthly charges vary by type of light and the lumens rating, which drives a different kWh use per month. The lights are on from dusk to dawn, and the charge is averaged over the full year and does not change as the length of the day changes.

The new LED rate structure allows two different options:

- The **standard option**, where the utility owns the LED fixture; and
- The **customer-ownership option**, where the customer owns the fixture, which is installed and maintained by the utility.

The City of Asheville chose the customer-ownership option. Under this option, they are responsible for purchasing a PEC-approved LED fixture. The utility is responsible for installing, operating and maintaining it. (All of these costs, including installation, are included in the monthly rate.) The City provides a replacement fixture if one of the existing fixture fails.

The City worked with the utility to set up a purchase and installation schedule that was realistic for the utility to manage. This required several things:

- **Selecting a vendor.** The LED rate structure requires that the customer purchase “PEC-approved” LED fixtures. During the initial stages of discussion, the utility had only one approved vendor (BetaLED). Phase I of the City’s upgrade utilized this one manufacturer however the City communicated unwillingness to continue unless there was adequate competition. Since then two additional manufacturers have been approved, Leotec and GE. The City manages the procurement process and negotiates the prices for the fixtures with the manufactures representative.
- **Setting the number of lights to be replaced per year.** The City worked with the utility to figure out how many fixtures it could replace each year. The final plan calls for replacement of all 8,989 fixtures over a four year period. The schedule and cost for each phase is summarized in the spreadsheet below.

Feature	Phase 1	Phase 2	Phase 3	Phase 4	Total
Source of Funding	EECBG Grants	Bond Proceeds	Bond Proceeds	Bond Proceeds	
Amount	\$272,000	\$1,091,040	\$1,675,526	\$1,093,633	\$4,132,199
Fixtures Installed	730	2,800	4,300	1,041	8,871
Bond Term	NA	10 years	10 years	10 years	
Estimated Interest Rate	NA	3.65%	3.65%	3.65%	
12 month Savings after operational expenses and debt service is paid	\$47,538	\$182,236	\$280,016	\$175,528	\$685,418

- Negotiating the phasing of the rate savings.** The rate changes for each individual streetlight had to be managed on a light-by-light and month-by-month basis. In a year in which up to 4,300 units are being replaced, the month of installation had to be noted for each light to manage the phasing in of the new rates based on the installation schedule. (The City and the utility decided to avoid the complexity of having a pro-rated schedule for a fixture that was replaced in the middle of a month and instead opted to have the new rate effective for the month following the month in which the fixture was replaced.)
- Determining which lights to replace each year.** A geographic schedule was set up to identify which specific lights would get replaced on which street for each year. Maps of the replacement plan are posted on the Office of Sustainability web site.

Financial Model

The Green CIP (including the LED streetlight program) is managed as an energy savings revolving program or like an internal Energy Performance Contracting arrangement:

- The City borrows funds to make the energy efficiency improvements
- A baseline energy cost is established.
- The difference between the baseline and actual costs after the efficiency improvements is calculated as the savings.
- Since those savings are accrued in an operational line item the first expenditure from those savings are operational such as staffing.
- The savings minus operational expenses are then transferred to the debt service fund to pay off the principal and interest on borrowed funds.
- Lastly any surplus is transferred to the capital reserves which allows can roll from one year to the next and be retained to support the Green CIP revolving fund in years with significant expenditures.

“Internal Energy Performance Contracting works well if you have projects where the savings are clear and easy to calculate so you don’t have to use complex energy modeling software. LED replacement definitely fell in this category.”

A total of \$3,860,199 of the replacement cost will be financed by 3 bonds issued by the City annually starting FY 11-12. The interest rates for the bonds are estimated to be 3.65% per year. The bonds are expected to be 10 year terms. All of the bonds will be paid off by the end of FY 2023-2024. The total cost of financing over the period of all the bonds will be \$4,635,134. The total energy savings over this same time frame will be \$7,962,134, resulting in net proceeds to the Green CIP fund of \$3,327,000. This \$3.3 million is allocated to the following purposes:

Staffing in the Sustainability Office and Facilities Maintenance	\$2,000,000
LED Replacements	\$ 137,500
Biodiesel 20% blend	\$ 650,000
Surplus Revenue to Invest in Projects	<u>\$ 539,500</u>
Total	\$3,327,000

The funding of the LED streetlight replacement program required the City Council to leave the budget line item for street lights unchanged and authorize the allocation of the difference between that amount and what is actually required by the new LED rate structure to the Green CIP fund. The City Council authorized this energy performance contracting relationship for a minimum of 13 years (the time required to retire all the debt).

Performance Metrics

The key performance metrics for this innovation include:

Metric	Definition	Results
<i>Energy Efficiency</i>	kWh of energy saved	<ul style="list-style-type: none"> • 3,366,402 kWh annually
<i>Carbon Reduction</i>	Tons of CO2 equivalent saved	<ul style="list-style-type: none"> • Retrofitting of all 9,000 lights will save approximately 2628 tons of CO2 per year • Total carbon savings represents a 7.1% reduction in the City’s carbon footprint
<i>Cost Savings</i>	Reduced cost of street light energy and maintenance	<ul style="list-style-type: none"> • Average savings is 50% of existing costs • Each retrofitted LED light saves an average of \$71 in energy costs per year • Replacement of all 9,000 fixtures will save an average of \$638,000 per year
<i>Return on Investment</i>	Payback timeframe for capital investment	<ul style="list-style-type: none"> • 5.1 year payback

5. Best Practice Lessons

There are several best practice lessons from this case study that can be helpful to other USDN members considering a similar strategy.

- **Clear goals and mandates.** The fact that the City had a top-level commitment to measurable carbon footprint reduction was critical to the implementation of this innovation. It created a performance mandate carbon reducing investments.
- **Working relationship with the utility.** Through its involvement with the Community Energy Advisory Council, the City and City staff had developed a productive working relationship with the utility that enabled it to negotiate the LED rate structure, as well as work out the logistical details for implementation.
- **Positive return economic model and detailed financial modeling.** The fact that the City staff could clearly demonstrate a large measurable improvement in an otherwise

fixed cost of operations was critical to generating political support for this innovation. As Maggie Ullman noted: *“If you can make a revenue positive sustainability proposal, the political sell turns into a win/win proposition. But this required really detailed financial models. We really needed to know what we were talking about because it now involved serious long-term commitments. Because we were able to show that it more than paid for itself over the long term, the City Council was willing to let us retain our earnings to fund our operations. It was incredibly helpful for me to be nurtured by people from the Finance Department who really knew how to structure this analysis.”*

- **Detailed program management.** The work of actually managing the planning and logistics for the replacement of 9,000 fixtures, and managing the detailed finances for the Green CIP fund accounting is not a trivial task and required strong program management skills.

Questions to Consider for Replication in Other Cities

Category	Questions
<i>Political Will</i>	<ul style="list-style-type: none"> • Is there a strong commitment to achieving carbon footprint reductions? • Is this commitment embodied in a public plan? • Are there measurable performance metrics that create an incentive for demonstrating progress?
<i>Policy Environment</i>	<ul style="list-style-type: none"> • What is the “business model” for City street lights? • Who owns the lights? • What is the rate structure? • Is there a rate structure that allows you to effectively capture the savings from LED replacements?
<i>Utility Relationship</i>	<ul style="list-style-type: none"> • Are the utilities incentivized to upgrade to LEDs? • Do you have a good working relationship with the utilities that can manage a technically complicated program structure?
<i>Financial Model</i>	<ul style="list-style-type: none"> • Is your political leadership comfortable with an internal Energy Savings Revolving program of the Performance Contracting model? • Will they let you retain your savings in excess of the implementation costs? • What kind of payback terms are they willing to consider? • Do you have the ability to raise the capital for front-end implementation? • Do you have the technical support to put the financial models together?
<i>Program Management</i>	<ul style="list-style-type: none"> • Do you have the staff to plan and manage a technically complicated implementation process?

6. Potential Next Steps for USDN

A number of USDN members have expressed interest in implementing a similar strategy in their communities. Since this strategy heavily depends on having the right regulatory environment (meaning a street light utility rate that allows the municipality to reap the savings from LED replacements), the first step would be to research the street light ownership and rate structure in the relevant utility region. As an example, the following USDN members have common utility providers.

Utility	USDN Members
Pacific Gas and Electric	<ul style="list-style-type: none"> • Alameda County, CA • Berkeley, CA • Palm Springs, CA • San Francisco, CA • San Jose, CA
Ameren	<ul style="list-style-type: none"> • Columbia, MO • Branson, MO • Kansas City, MO • St. Louis, MO • Urbana, IL
ComEd	<ul style="list-style-type: none"> • Evanston, IL • Oak Park, IL • Chicago, IL
Xcel Energy	<ul style="list-style-type: none"> • St. Paul, MN • Minneapolis, MN • Denver, CO
Progress Energy	<ul style="list-style-type: none"> • Asheville, NC • Fort Myers, FL • Sarasota County, FL

Steps in a broader USDN strategy to replicate LED street light replacement could include:

- Identify USDN members who are interested
- Identify the common utility providers across interested members
- Research the ownership and utility rate structure for each utility
- Determine where:
 - An appropriate rate structure is in place
 - The current rate structure needs slight changes to be effective
 - A new rate structure is needed
- Organize USDN members to collaboratively approach their utilities to secure the right rate structures
- Create common presentation materials for USDN members to pursue implementation in their municipalities
- Explore group buying to reduce the cost of LED replacements
- Collectively monitor the energy and CO2 savings and publicize the results