



MARBLETOWN'S STREETLIGHT IMPROVEMENT PROCESS

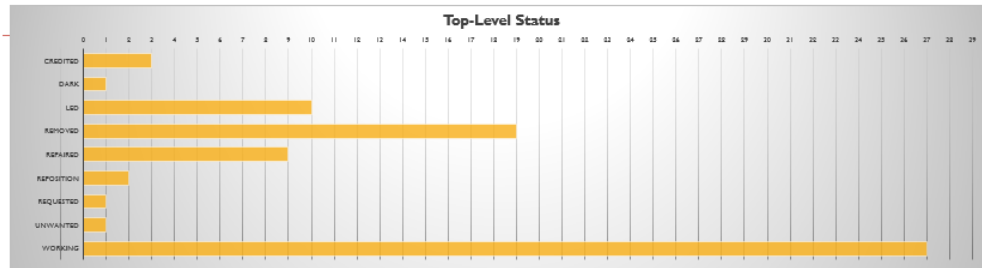
DATA BEFORE INVENTORY:

POLE #	TYPE	SIZE	RP	RTE	ST-LOC
K 0011369	MV	7000		A	ATWOOD & PEA
UH 0004031	MV	7000		A	FIREHOUSE
0146741	HPS	16000		A	HIGHLAND RD
0123514	MV	7000		A	PINE BUSH &
K 0046498	HPS	27000	R	A	RT 209 & KRI
K 0014698	HPS	27000		A	RT 209 & MAR
K 0067810	MV	7000		A	RT 213
K 0037905	MV	20000		A	RT 213 & RT
0104714	HPS	16000		A	TOWN HALL
CP 0057035	HPS	5800		A	TOWN LAND FI
0119767	HPS	5800		A	VLY-ATWOOD F
K 0020212	HPS	16000		A	WHITELANDS

DEPRESS ENTER FOR ADDITIONAL INFORMATION

DATA AFTER INVENTORY:

Inventory Summary



Status	Count	Most Recent Update	Annual Costs
Credited	3	Change	Removed
Dark	1	Post: LD.	10/20/05
LED	10	Updated	10/19/2016
Removed	19		
Repaired	9		
Reposition	2		
Requested	1		
Unwanted	1		
Working	37		
TOTAL	83		

Type	2015, Before Inventory	2017, After Removal	After LED Conversion
All Light	\$17,600	\$13,620	\$9,428

HOW WE STARTED

Central Hudson supplied us with pole ID numbers and truncated location data, which you can see on Page 1. Recent bills came from the town bookkeeper.

There were about 80 lights to look at, including several in Tongore Park, which are billed to the Youth and Rec Dept.

Then we simply drove and walked around, finding lights and matching pole numbers.

Billing Breakdown from One of Marbletown's Lighting Districts

For Street Lighting Service rendered the GENERAL TOWN CHARGE during the month of October 2015.

Size Lamps (Lumens)	Company Owned Fixtures		Monthly Charge	kWh
7000 Mercury Vapor	4	\$	57.88	308
20000 Mercury Vapor	1		18.31	168
5800 Sodium Vapor	5		65.05	160
16000 Sodium Vapor	4		57.84	268
27000 Sodium Vapor	2		35.06	234
Rental Poles (3)			14.61	
Total	16	\$	248.75	1,138

Early Spreadsheet Used During Inventory

Pole #	Location	CH Location	District/Rte	CH Type	CH Size	l int o
<i>separator</i>			<i>High Falls Dist.: 27 lights</i>			
0168943		Berne Rd	HF - A	HPS	5800	
0103349		Bruceville R	HF - A	MV	7000	
0103342		Canal Rd	HF - A	MV	7000	
0103341		Fairview Ave	HF - A	MV	7000	
0103340		Fairview Ave	HF - A	HPS	5800	
0103339		Lucas Toke &	HF - A	MV	7000	
0108804		Lucas Toke	HF - A	MV	7000	

THE DATA

A large majority of the inventory was completed by me and the chairman of Marbletown's Environmental Conservation Commission.

We used a rough spreadsheet to start, with a minimum of data columns.

Field work took precedent over computer time, so we added more columns and formatting as we went.

It became clear during our nightly field work that the town's streetlights were in a serious need of attention. One-third had a problem to address.

Some lights were not working properly; either off at night, flickering, or on during the day (dayburners). We also noticed some possible misbillings. Two lights appeared to be private, and two more were missing.

THE SPREADSHEET

Eventually our field work slowed down and I was able to spend more time on the advanced features of Excel, such as pivot tables. We created columns for everything so crunching numbers would be easier.

Marbletown Streetlights

Type	Pole I.D.	Update	Location	Dist/Rte	New Type	Orig. Type	New Size	Orig. Size
Credited	19767	Working	Vly-Atwood Fire Dept.	GTC / A	HPS	HPS	5800	5800
Dark	48301	Working	Bruceville Rd. @ Rt. 213	HF / A	HPS	HPS	27000	27000
LED	48302	Working	1204 Rt. 213	HF / A	HPS	HPS	16000	16000
Removed	48499	Working	30 School Hill Rd.	HF / A	HPS	HPS	5800	5800
Repaired	61427	Working	53 School Hill Rd.	HF / A	HPS	HPS	5800	5800
Reposition	62650	LED	Rt. 209 @Tongore Rd.	GTC / A	LED	Requested	3600	0
Requested	102575	Working	Rt. 213 across from 2nd St.	HF / A	HPS	HPS	27000	27000
Unwanted	102885	Removed	Old Rt. 213 @ P.O. Lot	HF / A	Removed	HPS	0	16000
Working	103298	Working	Steep Hill Rd. @ Mohank Rd.	HF / A	MV	MV	7000	7000
Working	103337	Removed	1462 Rt. 213	HF / A	Removed	HPS	0	5800
Working	103338	Working	2234 Lucas Tpke	HF / A	HPS	HPS	5800	5800
Working	103339	Working	Fairview Ave. @ Lucas Tpke	HF / A	MV	MV	7000	7000

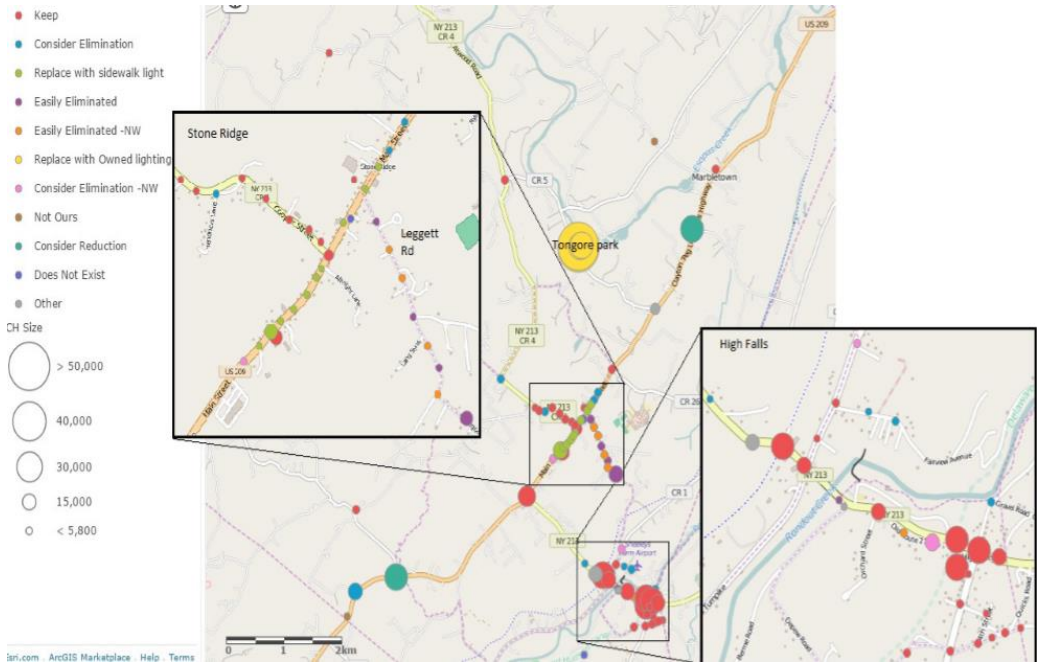
25% of the town's lights were eventually removed. At that point, we had more data columns than lights.

This isn't meant to be read; it's here to give a visual representation of how large our final spreadsheet is. The turquoise rectangle shows the scale.

The data fields include:

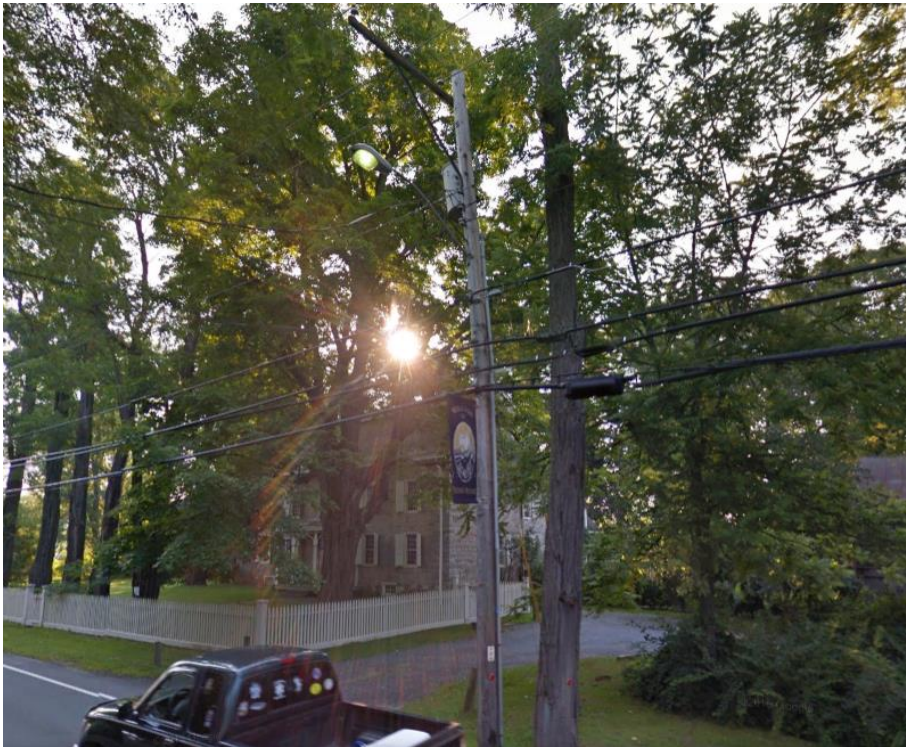
- Light information
- Pole information
- Observations about the area
- Removal opportunities
- Resident feedback
- Cost breakdowns
- Electricity usage

INVENTORY VISUALS



Above: Dropping our spreadsheet data into ArcGIS was helpful for presentations and group decisions.

Below: Google Street View kept us from having to drive back to every light when we needed extra information. Google’s copyright date for this image showed us that this dayburner had been on constantly for at least 3 years.



BILL CREDIT

We matched one pole number to a light in a church parking lot.

Aside from the odd location, the big giveaway that it isn't a town light is the fact it's facing away from the street.

This turned out to be a light that was being double-billed. The town received multiple years of credit, with interest.

We found one more misbilled light and discovered that another was knocked down during a car accident and never replaced.



Proving the non-existence of the streetlight below got our bill credit up to \$5,500. There was supposed to be a light near "Town Land," which turned out to be the town's Transfer Station. As you can see, it's not there. After months of no acknowledgement, I inventoried every power pole in each direction for more than a mile, and then inventoried the lights and poles at the Water District land nearby. It took a lot of work, but the money eventually appeared.



COST SHEETS

This is an example of how information would sometime come in bits. Below is a chart I dug up with no year listed and only sodium vapor lights included. When I received additional data, I'd cross-check it for accuracy.

Sodium Vapor Lights	Annual kWh	Annual charge	VS	Equivalent LED fixture	Annual kWh	Annual charge	Annual charge Savings Per year	Energy (kWh) Savings	Total Savings Per Street Light When Replaced with LED
70-watt sodium vapor	344	\$156.13		39-watt LED	156	\$140.18	(\$15.95)	(\$14.97)	(\$30.92)
150-watt sodium vapor	720	\$173.53		82-watt LED	328	\$158.03	(\$15.50)	(\$31.21)	(\$46.71)
250-watt sodium vapor	1,264	\$210.39		93-watt LED	372	\$191.01	(19.38)	(\$71.02)	(\$90.40)

What you see below is a more comfortable amount of cost data. It's also a lesson on taming the urge to make everything beautiful. This specific spreadsheet never saw the light of day, so there was no reason to punch up the formatting.

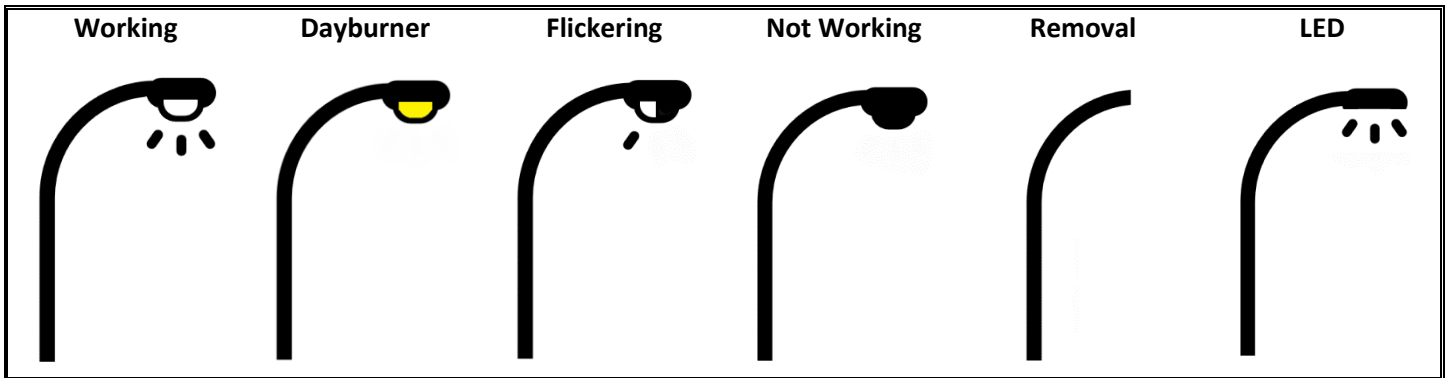
Type	Watts	Lumens	Fixture Watts	Annual kWh	Cost/Yr kWh	Cost 2015	Cost 2016	Cost 2017	2017 Total	Per Month
HPS	70	5800	86	344	\$17.20	\$156.13	\$163.31	\$169.55	\$186.75	\$15.56
HPS	150	16000	180	720	\$36.00	\$173.53	\$181.51	\$188.44	\$224.44	\$18.70
HPS	250	27000	316	1264	\$63.20	\$210.39	\$220.07	\$228.48	\$291.68	\$24.31
HPS	400	50000	496	1984	\$99.20	\$237.27	\$248.18	\$257.66	\$356.86	\$29.74
MV	175	7000	208	832	\$41.60	\$173.69	\$181.68	\$188.62	\$230.22	\$19.19
MV	250	11000	296	1184	\$59.20	\$188.41	\$197.08	\$204.61	\$263.81	\$21.98
MV	400	15K/20K	455	1820	\$91.00	\$219.83	\$229.94	\$238.72	\$329.72	\$27.48
LED	39	3600	39	156	\$7.80	\$126.04	\$131.84	\$136.88	\$144.68	\$12.39
LED	82	7200	82	328	\$16.40	\$166.71	\$174.38	\$181.04	\$197.44	\$16.45
LED	93	10000	93	372	\$18.60	\$200.02	\$209.22	\$217.21	\$235.81	\$19.65
LED	153	17600	153	612	\$30.60	\$229.14	\$239.68	\$248.84	\$279.44	\$23.29

Energy estimate is 5 cents per kWh, or \$0.20/W per year = (\$0.05 x 4000 h/year / 1000 W/kWh)

This might be a good place to point out that we also tamed the urge to create a lengthy report. We created documents as needed and never got beyond Excel charts, PowerPoint presentations and what you see on the next page.

INFOGRAPHICS

I needed to create visual anchors to make Word docs/email attachments easier to digest. I decided on icons.



I eventually created a data box for every light, and used them for repairs, removal requests, repositioning requests and status updates. These were a useful addition to Excel pivot tables, which automatically created the charts. (See page 1.)












Voting for Marbletown Streetlight Elimination

September 22, 2016

There are 10 streetlights that can be removed through Board action. An 11th light is being requested as an addition. Making the following four decisions before looking at the single lights can speed up the process.

STEP 1	STEP 2	STEP 3	STEP 4
Pass the Draft Resolution (sent to Mike on 9/22) allowing Central Hudson to replace broken lights with appropriately sized LEDs.	Decide whether you would want to keep a streetlight if a single homeowner wants it for either safety, aesthetics or to use as driveway illumination.	Decide whether you accept the opinion of highway departments that streetlights outside of pedestrian areas do not increase public safety.	For areas that are reported to be causing drivers problems, decide whether it would be better to add signs and/or reflective material.

THE LIGHTS

 <p>HIGH FALLS P.O. LOT ID: 102885 Status: Not Working</p> <p>One homeowner doesn't want it. Another wants it for his driveway. Businesses don't need it. It could illuminate the second-floor apartments.</p>	 <p>LUCAS at HOBSON'S CHOICE RD. ID: 108804 Status: Broken dome. Sometimes on during the day and off at night.</p> <p>Main problem: Too far away from Leggett Rd. to be of use there.</p>	 <p>PEAK RD. AT 213 ID: K0011369 Status: Working</p> <p>Bottom Line: One homeowner is strongly against removal, citing heavy traffic and crime deterrence. Another is on the fence.</p>
 <p>HENDRICKS LANE AT OLD COOPER ID: UH002028 Status: Working</p> <p>Bottom Line: Does not illuminate 213. One homeowner wants it. Another doesn't.</p>	 <p>**REQUESTED LIGHT** 209 and Schoonmaker</p> <p>For: Many people want it. It could make the turn to Schoonmaker easier at night.</p> <p>Against: Expensive. Could be better served with signage and/or reflective material.</p>	<p>NOTE</p> <p>There are eight town lights on Leggett Road. We are removing one per request, and keeping one closest to 209 per request. The remaining six lights are below.</p> <p>A highway employee spoke before the Board about lights giving people a false sense of security and allowing them to drive faster.</p>
 <p>NEAR 55 LEGGETT RD. ID: 109470 Status: Not working</p>	 <p>NEAR 65 LEGGETT RD. ID: 109473 Status: Not working.</p> <p>A homeowner near this light would like all of the streetlights on Leggett Road removed.</p>	 <p>NEAR 86 LEGGETT RD. ID: 109479 Status: Not working</p>
 <p>NEAR 86 LEGGETT RD. ID: 109481 Status: Working</p>	 <p>NEAR 125 LEGGETT RD. ID: 109484 Status: Not working</p> <p>This light is on a curve. It is the only Leggett light up for debate where we specifically received a "keep" request.</p>	 <p>NEAR 126 LEGGETT RD. ID: K0014551 Status: Working</p> <p>A nearby homeowner noted potential energy savings and complained of area light pollution.</p>

REMOVALS: THE HOMEWORK

The infographic on the previous page was for the Town Board to consider removals (decommissioning). At that point, we had already spent months on preparation.

We talked to homeowners, fire chiefs, the Highway Department and got opinions from experts.

Below is the draft of a letter the town sent out in advance of public comment. There were multiple versions, and they went to all homeowners living within a certain distance to every light under consideration for removal. The town added its letterhead to the drafts, and the Town Supervisor signed every one.

Michael E. Warren
Supervisor, Town of Marbletown
1925 Lucas Avenue
Cottkill, NY 12419

April 1, 2016

[REDACTED]

Stone Ridge, NY 12484

Dear [REDACTED],

As part of the Town of Marbletown's efforts to promote energy efficiency and keep down costs, we are considering converting street lights in Town to LED technology. As a first step in this process, we took an inventory of the 76 street lights in the Town of Marbletown, and found that a number of them are not working, not working properly, may be too bright for the area, or too dim, and that some lights may not be needed and possibly could be removed.

There are two streetlights on Main Street (Route 209) in the mostly residential north end of Stone Ridge which may not be needed: one at approximately 3476 Main St, and one at approximately 3501 Main. Since you own property in this area, we would like your input on the possible elimination of these street lights. Please feel free to contact me by email, or mail any comments you may have in the enclosed postage-paid envelope. We would appreciate receiving any comments by May 1, 2016.

Thank you.

Sincerely,

Most feedback was in support of removals, with homeowners citing light pollution and energy savings. One of our fire chiefs was present at the Board meeting during public comment in case anyone had safety concerns.

One of the reasons this process was so successful was because we didn't have an agenda of saving as much money as possible. Logic allowed us to take some lights out of consideration for removal while still doing the field inventory.

REMOVALS: THE FORMS

We had two rounds of removals in the months following the inventory. There is a third underway, which will put the town at 20 removed lights, or 25%. For each round, the utility needs a page for each lighting district.

CENTRAL HUDSON GAS & ELECTRIC CORPORATION
 RTE 28 AT THRUWAY CIRCLE
 KINGSTON, NY 12401-3601
 (845) 452-2700

STREET LIGHTING AUTHORITY ORDER

PAGE 1

TOWN OF MARBLETOWN
 TOWN CLERK
 PO BOX 217
 STONE RIDGE NY 12484-0217

ORDER NO.: H3-02498
 ACCOUNT NO.: XXXXXXXXXX
 DATE: 07/06/16

TO CENTRAL HUDSON GAS & ELECTRIC CORPORATION:

YOU ARE HEREBY AUTHORIZED TO MAKE CHANGES SPECIFIED BELOW TO THE STREET LIGHTING SERVICE FOR THE HIGH FALLS LGTG DIST WITH A RESOLUTION DULY ADOPTED AS PROVIDED BY LAW BY THE Board (COUNCIL/BOARD OF THE Town OF Marbletown AT A MEETING HELD ON June 19, 2016 AS FOLLOWS

ACTION:
 INSTALL

OR REMOVE	TYP & SIZE OF LAMP	POLE NO	RATE **	MAP & GRID	LOCATION	DATE COMPLETE	ADJ AMT
REMOVE	MV 7000	103341	A	099	FAIRVIEW AVE		15.14CR
REMOVE	HPS 5800	103337	A		RT 213		13.60CR
REMOVE	HPS 5800	103340	A	099	FAIRVIEW AVE		13.60CR
REMOVE	MV 7000	103348	A	099	OLD RT 213		15.14CR
REMOVE	HPS 5800	146519	A		RT 213		13.60CR

REMOVE STREET LIGHT PER TOWN REQUEST

- ** A. COMPANY OWNED AND MAINTAINED; ANNUAL OR SEASONAL SERVICE
- ** B. CUSTOMER OWNED/COMPANY MAINTAINED
- ** C. CUSTOMER OWNED/CUSTOMER MAINTAINED

THESE CHANGES ARE SUBJECT TO THE TERMS OF THE EXISTING STREET LIGHTING SERVICE CLASSIFICATIONS. DOES NOT INCLUDE THE COST OF ELECTRICITY.

MUNICIPALITY Town of Marbletown BY Michael Warren
July 6, 2016 TITLE Supervisor
 W.O.NO. 6683R DATE WORK COMPLETED _____ BY _____


REPOSITIONING

We had two lights that needed to be repositioned. One was shining over the road but useless for the fire house at the corner. The other was illuminating a small road, but no light hit the state highway it intersected with.

I made the two pages below with the intention of them going straight to the utility, so there would be no question about the new light position.

Repair and Reposition Request: Streetlight 123514

Pine Bush Rd and Jimmy's Rd at Kripplebush Firehouse
519 Pine Bush Rd., Stone Ridge, NY 12484



KRIPPLEBUSH FIREHOUSE
ID: 123514
Status: Malfunctioning
Type: 7000 MV


Problems: For years, the light has buzzed and is sometimes off at night. Light spread bothers neighbor.

Goal #1: Replace the current malfunctioning light with a new LED. Per the Town Board Resolution to Central Hudson dated 4 Oct 16, the light should be a 39W LED fixture.


Goal #2: Reposition light using pics as a guide.

DETAILS

Pic 1: Stand at Circle to See Where Arm Should Point




Pic 2: Arm Should Pass Over the Stop Sign and "Point" Toward the Corner of the Building Circled Above



Nov 21, 2016 - Jason Zimmerman - jim_jason@gmail.com

Reposition Request: Streetlight K0020212

White Lands Rd. at Rt. 209
Approximate street address: 4441 U.S. 209, Stone Ridge, NY 12484



White Lands Rd.
ID: K0020212
Status: Working
Type: 16000 HPS


The ~~Mohawk~~ ECC had considered suggesting this light be removed since it is not effective at illuminating Rt. 209. But this area has seen the most vehicle accidents in the fire district. Despite a large majority of these accidents occurring during the day, the ECC still believes it is important to keep this light.

Goal 1: Reposition arm to point as close as possible to Rt. 209.


Goal 2: Per Town Board Resolution to Central Hudson dated 4 Oct 16, the light should be replaced with a 39W LED.

DETAILS

Pic 1: Looking at 209; Circle is Where Pic on Right Was Taken



Pic 2: Light Should Be Pointing Closer to 209



Nov 21, 2016 - Jason Zimmerman - jim_jason@gmail.com

REPAIRS



I noticed a mystery LED shortly after we had placed a repair call on an old light and made some inquiries.

Turns out the utility had decided to start replacing broken lights with LEDs, using the closest equivalent size. It was way too bright at night.

This was when we found out we could have the town pass a resolution on sizing guidelines. This meant “free” LEDs that were sized according to need, not based on older lights that might have been too bright to begin with.

Below is the first part of the resolution, which was passed as quickly as possible and went straight to the utility.



TOWN OF MARBLETOWN

A regular meeting of the Town Board of the Town of Marbletown was convened in public session at the Town Hall, 1925 Lucas Avenue, Cottekill, New York on October 4, 2016 at 7:00 o'clock PM local time. The meeting was called to order by Supervisor Michael Warren and upon roll being called, the following were present:

Present: Joe Borzumato, Douglas Adams and Michael Warren

Absent: Tim Sweeney and Patricia Clarke

The following Resolution was offered by Councilman Adams, seconded by Councilman Borzumato to wit:

Resolution: #39-2016: Town of Marbletown Guidelines for Sizing LED Replacement Streetlamps

WHEREAS under Central Hudson Gas & Electric Company (“Central Hudson”)’s Blanket Authority which replaced streetlamps in accord with the size of the lights currently in use that are

Before the year was up, the town had 10 LEDs. Eight were from repairs and two were new additions. Some lights were repaired before the utility made the LED replacement decision, so those lights are still mercury vapor or high-pressure sodium.

ADDITIONAL LEDs

The town has boiled down the purchasing decision to three options:

- The Mid-Hudson Streetlight Consortium
- Central Hudson
- A combination



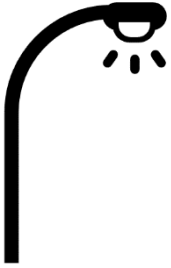


The current idea is a combination. Marbletown is involved in NYSERDA’s Clean Energy Communities program with the goal of receiving funding for additional projects. A 50% conversion level will complete one CEC action. Because of this, the town might want to work quickly to add more LEDs. This can be accomplished through Central Hudson using some of the bill credit received from misbillings.

If that is the decision, Marbletown can wait for the Consortium to determine what to do with the remaining 50% of its lights.



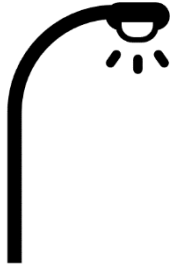
LED PURCHASING FACTORS

Factor	Mid-Hudson Streetlight Consortium	Central Hudson
<i>Availability</i>	Waiting for Conclusions	Now
<i>Fixture Types</i>	Unknown	Might be increasing
<i>Price to Switch Out Light</i>	Unknown	\$117
<i>Average Annual Fixture Increase</i>	Unknown	4.2 percent (2015-2017)
<i>Buy Light from Central Hudson</i>	\$234	--
<i>Upkeep Costs After Buyout</i>	Unknown	--
<i>Power Charge After Buyout</i>	Unknown	5 cents per kWh

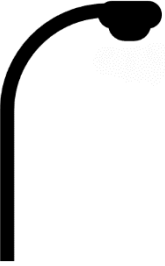
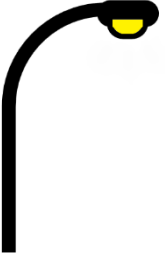
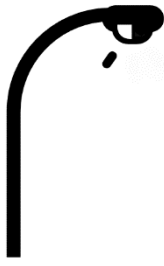
2015 INVENTORY

 <p>ORIGINAL COUNT Central Hudson's 2015 bills showed:</p> <p>80 lights</p>	 <p>TOWN BILLS High Falls, Stone Ridge, General, Youth & Rec:</p> <p>4 accounts</p>	 <p>PROBLEM LIGHTS Dark, dayburners, flickering, misbilled.</p> <p>30%</p>
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INVENTORY RESULTS

 <p>MISBILLED Two lights weren't ours. One light didn't exist.</p> <p>3 lights</p>	 <p>BILL CREDIT Misbillings and one light that was knocked down.</p> <p>5,500</p>	 <p>ACCURATE COUNT Corrected bills from Central Hudson:</p> <p>77 lights</p>
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2016 REPAIRS

 <p>OFF AT NIGHT Bad bulb or sensor. Two broke in 2016.</p> <p>13 lights</p>	 <p>DAYBURNERS Some had been on 24/7 for 3+ years:</p> <p>6 lights</p>	 <p>FLICKERING Either constantly or at various times:</p> <p>3 lights</p>
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REMOVALS AND CURRENT COUNT

 <p>REMOVED 20 lights not needed and/or not wanted:</p> <p>26%</p>	 <p>2017 INVENTORY With 4 new lights added along 209:</p> <p>61 lights</p>	 <p>LEDs 4 new and 7 switched out during repairs:</p> <p>18%</p>
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RESOURCES AND CONTACTS

Used For Inventory:

- Town streetlight list
- Town Bills
- Spreadsheet
- GPS Coordinates
- ArcGIS map
- Street view Grabs
- Photos

Created For Communication:

- Presentations
- Infographics
- One-sheets

For Repairs, Removals, Conversions

- Cost comparison lists
- CH Authority Order template
- Town resolution for utility
- Resident letter

Communication With:

- Town Supervisor
- Town Board
- Residents and businesses
- Fire and highway departments
- ECC
- Other towns
- Central Hudson
- NYSERDA
- CSC
- CEC
- Auditors
- Mid-Hudson Streetlight Consortium:
Courtney Strong Inc.
Citizens for Local Power