DEPARTMENT OF PUBLIC SERVICE REGULATION
BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MONTANA

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PUBLIC SERVICE COMMISSION
REGULATORY DIVISION

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IN THE MATTER OF THE PETITION OF JAMES T. AND ELIZABETH A. GRUBA; LEO G. AND JEANNE R. BARSANTI ON BEHALF OF THEMSELVES & OTHERS SIMILARLY SITUATED, Complainants.	)	
VS.	)	
NORTHWESTERN ENERGY, Defendant.	)	**DOCKET NO. D2010.2.14**

PRE-FILED WRITTEN DIRECT TESTIMONY OF COMPLAINANTS' WITNESS, EDWARD SMALLEY
April 07, 2014

Q. Please raise your right hand. Do you solemnly swear or affirm that the written testimony below and any written or oral testimony or responses to data requests following it will be the truth the whole truth and nothing but the truth, so help you God?

A. I do.

Attorney. You will be under oath during this entire proceeding.

[Proof of Complaint ¶¶ I, II(2) & (3), III(2) & (3), VI(1), VII, X, XI, 67, 197 - 201.]

Q. Please state your name, business and email addresses, and phone number.

A. My name is Edward Smalley. My work address is 700 Fifth Avenue, Suite 3200, SMT 3644, PO Box 34023, Seattle, WA 98124-4023. My email address is Edward.Smalley@Seattle.gov . My phone number is (206) 386-1571.

Q. Please tell us about your occupations?

A. I currently work for the City of Seattle's Seattle City Light Department. I have worked for the municipal utility since 2000 and have been a City employee for nearly 25 years either

1 designing or managing public street lighting. I am currently working in the utility's Conservation
2 Resources Division where I manage the utilities Lighting Design Lab, renewables programs, and
3 other conservation services to our customers. Prior to this assignment and until April 1, 2014, I
4 worked in the utility's Government and Legislative Affairs Division where I was the Director of
5 the US Department of Energy's Municipal Solid-State Street Lighting Consortium, a national
6 program Seattle managed on behalf of the US Department of Energy. I had that role since April
7 2010. Until 2012 I was also the manager of the utility's Streetlight Engineering unit. In that
8 capacity I was responsible for managing the more than 86,000 street and area lights for the City
9 of Seattle and seven suburban jurisdictions the utility serves. External to the utility, I am the
10 Chair of the Illuminating Engineering Society of North America's Street and Area Lighting
11 Committee. From 1991 to 2000 I worked for Seattle's Engineering Department in various
12 engineering roles designing and inspecting streetlight and traffic signal installations. Prior to
13 that, I started my career at the City at Seattle City Light as a field engineering aide working in
14 streetlights. Prior to coming to the City of Seattle I spent five years working in the electronics
15 industry designing various electronics applications.

16 **Q. What is the Municipal Solid-State Lighting Consortium?**

17 A. It is a group of more than 430 municipalities, utilities, states, counties and other
18 street lighting system owners across the US formed in 2010 by the US Department of Energy to
19 aid street lighting system managers in their investigation of solid-state – light emitting diodes
20 (LED) - streetlights in an effort to accelerate the adoption of LED streetlights throughout the US.

21 **Q. What is Seattle City Light?**

1 A. Seattle City Light is a municipally owned utility by the citizens of Seattle since 1905. It
2 is the 10th largest public power utility in the US with 405,000 metered customers. In 2008, it
3 sold 15,587,096 MW hours of electricity generated mostly from the five hydroelectric plants
4 owned by the utility. These provide 6,284,760 MW of generating capacity. The utility serves the
5 City of Seattle and 8 suburban jurisdictions.

6 **Q. Does Seattle City Light own street lights?**

7 A. Yes, we have 86,000 streetlights in the system.

8 **Q. Once those lights are paid for, do your customers have to defray the original cost of**
9 **the lights again, that is do they pay more than once for the original cost of the lights?**

10 A. No. Once the streetlight capital costs are paid for, our customers are only responsible
11 for paying the on-going operation and maintenance cost, as well as the electricity.

12 **Q. Do the customers of Seattle City Light have to pay more than the initial capital costs**
13 **of the street lights installation than what Seattle City Light paid for them plus the costs of**
14 **financing?**

15 A. No. We only recover what it cost the utility to install and maintain the system, plus
16 any interest on capital costs as mandated by state law.

17 **Q. As part of your jobs have you made presentations concerning roadway lighting?**

18 A. Yes, many presentations.

19 **Q. Mr. Smalley, I am showing you what has been marked as Complainants' Exhibit 13.**
20 **Do you recognize this exhibit?**

21 A. [Ex. 13, Slide 1] Yes, Complainants' Exhibit 13 is a compilation of various PowerPoint
22 Slides I or colleagues have used while giving speeches on the topic of roadway lighting. Mostly it

1 is from a presentation I gave to the 2013 National League of Cities Congress in Seattle on
2 November 13, 2013. It covered the State of LED Streetlight Adoption in the US and also focused
3 on how communities could save money while reducing operating costs, improving on light
4 quality and the impacts on public safety.

5 **Q. Where did you get the information on the slides?**

6 A. From research I have done and as a result of experience gained in the jobs mentioned
7 above.

8 **Q. As a result of your jobs have you become familiar with the technological progress**
9 **made by solid-state lighting?**

10 A. Yes, I have experienced quite a number of presentations on the subject by experts in
11 the field. The technological progress of lighting is summarized by the next slide in
12 Complainants' Exhibit 13.

13 **Q. Please explain that slide?**

14 A. [Ex. 13, Slide 2] You will notice that in the 1980s utilities began a mass conversion to
15 high pressure sodium lights largely because we could get the same amount of light with less
16 than half the energy use of the then incumbent technology. LEDs had been invented in the
17 1960s and we have seen their use in aviation as indicator lights early on due to their high
18 reliability. In the late 1990s high brightness LED made these an appropriate application for
19 stoplights where they use about 10% of the electricity needed to illuminate the colored lights in
20 traffic signals. This was a 100 year leap over the incumbent incandescent lamps previously used
21 for that application. In addition, traffic signal lamps that use to require replacing every nine (9)
22 months could now be replaced every ten (10) years; creating a huge O&M savings for the

system owner. The technology for white light emitting diodes, though lasting a very long time, had not reached incandescent efficiency until 2000. In the ten years following that, the amount of white light produced from a watt of electricity has increased almost a hundred-fold to 150 lumens per watt. In fact, the LED chip manufacturer Cree announced this week they have achieved 303 lumens per watt (lm/W) efficiency.

Q. How many street lights do we have in the US?

A. [Ex. 13, Slide 3] The next slide shows 26.5 million. Some estimates say 44 million. The last line indicates the technology used in those is 90 years old and the average age of these lights is 25 years. Energy to illuminate streetlights in the US costs tax and ratepayers $2 billion a year and $4 to $6 billion a year to operate and maintain them.

Q. What factors add to the $4 to $6 billion yearly cost of maintaining conventional street lights?

A. [Ex. 13, Slide 4] There are three components that make up the cost of streetlights: operations and maintenance (O&M); capital, or first costs, recovery; and the cost of energy. O&M includes everything needed to ensure the light is functioning properly such as 1) actions focused on scheduling, procedures, and work/systems control and optimization; and 2) performance of routine, preventive, predictive, scheduled and unscheduled actions aimed at preventing or remedying equipment failure – such as replacing lamps and photo controls. The streetlight technology used has the largest baring on these costs. The most commonly used street lighting technology in the US is High Intensity Discharge (HID) High Pressure Sodium (HPS). HPS accounts for 75% of all streetlights and these typically experience an outage rate of three to five years, or four (4) years on average. It is common for the illumination of this

technology to dim, or depreciate, by 30% or more prior to burning out; but the luminaire will consume the same amount of power as when it was at its brightest. What this means in practical terms, is that illumination engineers design a system to burn 30% brighter and use 30% more energy than is needed for the first few years, so that when the light depreciates it still provides the needed illumination. Prior to Seattle's LED program the mortality rate of HPS streetlights translated to a 25% annual outage rate which costs the General Funds of Seattle and the other jurisdictions the utility serves nearly $2.3 million a year in O&M costs. There is an additional $13 million a year in energy and capital recovery costs for this type of system. In addition, citizens had to wait sometimes up to two months for a repair during the peak winter outage season. To reduce costs and provide better customer service, I put in place a preventive maintenance program in Seattle that anticipated most outages and replaced lamps on a group basis throughout the service territory. While this reduced cost from $2.3million per year to $1.4million per year, there were still over 3,000 outages a year and the quality of light had not improved. So in 2009 we decided to convert our system to LED.

Q. How did you approach your LED exploration?

A. [Ex. 13, Slide 5] I led my team of engineers in putting together a very methodological program. Our process included the five steps shown on slide 5, and include: 1) Evaluation of Seattle's roadway illumination design criteria; 2) Evaluation of vendor products including datasheets and independent laboratory testing reports; 3) Computer modeling of luminaire performance of products making it past steps 1 and 2; 4) Physical sample evaluation by our engineers and crews and mock-up and evaluation on utility premises; and 5) In-situ illumination performance evaluation.

Q. Does everyone wanting to adopt LED street lighting need to go through these processes?

A. To some degree, though this can be done jointly with multiple agencies/jurisdictions. [Ex. 13, Slide 6] In addition, we have shared much of what we have learned at the DOE MSSLC web site. For example, street lighting system managers can use the MSSLC *Model Specification for LED Roadway Luminaires* when soliciting products for evaluation or procurement through an informal process or a more formal request for proposal (RFP) process. A very helpful user's guide is also available. These and others can be downloaded at http://www1.eere.energy.gov/buildings/ssl/specification.html. They include parameters for all of the areas shown on this slide.

Q. Have the specifications been useful for others?

A. [Ex. 13, Slide 7] We believe our specifications have been useful to others. In 2012, the model specification page was downloaded 3,500 times. This slide shows some governments and utilities that have used them. Currently, the City of Detroit is using the Model Specification in an RFQ seeking to purchase 40,000 LED streetlights.

Q Did your specifications help you narrow the field of LEDs that were competing for your business?

A. [Ex. 13, Slide 8] Yes, we used them to narrow the field to about 30 luminaires as you can see by this slide.

[Ex. 13, Slide 9] We had created a spreadsheet to track the fixtures that had been submitted to us. We narrowed our selection further to 10 luminaires after comparing the features of the 30 fixtures that had made our first cut.

1 [Ex. 13, Slide 10] We then evaluated independent laboratory reports of the 10 that had
2 made the second cut to confirm lighting levels.
3 [Ex. 13, Slide 11] We also had our installation crews assess whether they passed the test
4 of utility grade; would be easy to install and would be easily maintainable using standard tools
5 used by utility workers.
6 [Ex. 13, Slide 12] Three luminaires made the third cut.
7 **Q. What did you do with those three luminaires?**
8 A. [Ex. 13, Slide 13] We then installed a number of these three luminaires on Seattle
9 streets to survey citizen response and gage light levels as demonstrated by Exhibit 13, Slides 14
10 & 15.
11 **Q. Have any other cities gone through an extensive luminaire testing process?**
12 A. [Ex. 13, Slide 16] Yes. Los Angeles, for example. Its involvement is noted on the MSSLC
13 web site. It began by testing 244 LED units. It lists the units it has accepted on the Los Angeles
14 web site at http://bsl.lacity.org/led-contractors-vendors.html . In addition, many other cities
15 have gone through a similar process such as: City of Independence (MO), Kansas City (MO), Las
16 Vegas (NV), Boston (MA), New Orleans, New York (NY) and numerous other cities. We have
17 over 430 municipalities and utilities who belong the DOE MSSLC consortium who are at some
18 stage of LED across the country
19 **Q. When did you begin all this testing and when did you move beyond the testing**
20 **phase?**
21 A. [Ex. 13, Slide 17] As part of our commitment to help the local governments in our
22 area reduce their overall costs, in 2007 Seattle City Light began testing various manufacturers'

1 LED streetlight products. We moved to the implementation phase in 2010. Over a four year
2 period since then, we have installed more than 43,000 residential cobrahead LED streetlights,
3 and thousands of arterial LED streetlights. [Ex. 13, Slide 18] The total cost of the residential
4 installation was $16.7 million, $10 million less than the original estimate. This was due to
5 rapidly falling prices.

6 **Q. I noticed from your last two slides that you installed 10,000 LED cobraheads in**
7 **2011, 2012, and 2013. However the installation cost went down each year. Please explain**
8 **that?**

9 A. [Ex. 13, Slide 19] The bulk purchases of 2,500 or more fixtures by Seattle and other
10 cities and technological improvements have driven luminaire costs down by half within four
11 years for 100 watt HPS equivalent units. To replace this unit today cost less than a third of 2010
12 costs.

13 **Q. What savings have you been able to achieve in Seattle to reduce its street lighting**
14 **costs?**

15 A. [Ex. 13, Slide 20] As of the end of 2013, Seattle City Light has saved it's street lighting
16 customer $2.6 million per year in energy and maintenance costs by the conversion to LED street
17 lighting, 75% of this savings going to the citizens of Seattle.

18 We anticipate the savings will approach between $4-5 million a year once all 86,000
19 streetlights are converted to LED. At that point we will have reduced our street lighting energy
20 use by more than 60%, and our total City of Seattle municipal energy use by 24%.

21 **Q. Please tell us why your estimates of savings have changed?**

A. Three reasons: First, we are saving more energy than originally projected. At the time the project began replacement units were saving around 40% in energy for residential streets. Today that number can be as high as 70%. Second, as I explained above, luminaire prices have gone down drastically while performance has gone up. For instance, when we began the program the cost of a residential unit was over $350. Today a better performing unit costs near $150. Another contributing factor is a much lower than anticipated failure rate. We anticipated a 10% failure rate for all units installed and we built in additional cost in our billing rate to recapture those anticipated future expenses. Our records show the failure rate is actually less than 1%.

Q. What is the wattage of the unit costing $150 and what wattage is it intended to replace?

A. The unit costing $150 replaces the 100W and 150W HPS luminaire.

Q. I've seen your use of the $150 luminaires in residential areas. Are you deploying them elsewhere?

A. Some neighborhood commercial areas use a 150W HPS luminaire. Because of the multiple drive current imbedded in the LED units, we are able to make a quick adjustment during installation to increase the light output for these higher light levels areas. The unit uses more energy when this is done but still less than half of what it is replacing with the same cost savings.

Q. Can you tell us about the wattage and cost of higher wattage LEDs and say what they are being used to replace?

1 A. It is important to note that with LED technology, the wattage is constantly going
2 down, so when an engineer specifies a luminaire, they identify the necessary illumination
3 performance, or lumen package, not wattage. However, they do compare this to the
4 incumbent performance of the older technology. Seattle has used LED streetlights to replaced
5 250W HPS and 400W HPS cobrahead luminaires with cost between $250 and $500 respectfully.
6 These have been in the lower quantities. However, Los Angeles has replaced the same type of
7 streetlights in larger quantities with cost averaging below $300.
8 **Q. Since you have installed these lights, have you experienced any failures of the**
9 **lighting mechanism?**
10 A. We have not experience one actual LED lamp failure. As noted above we have
11 experienced less than 1% failure with the luminaire themselves. Many of these failures can be
12 attributed to driver failure and workmanship. All failures have been covered under
13 manufacturer warranties.
14 **Q. What warranty periods do you specify in your requests for proposal?**
15 A. [Ex. 13, Slide 21] We now specify a 10 year period. You will notice that the 10-year
16 warranty period lasts longer than the 7.5-year payback period. Often the payback period is
17 shorter than 7.5 years if the cost of energy is higher than in Seattle. And as expected, we are
18 receiving fewer complaints about street lighting issues now.
19 **Q. Is Seattle unique in converting to LED street lights?**
20 A. [Ex. 13, Slide 22] No. As noted above, the Municipal Solid-State Lighting Consortium
21 has more than 430 active US cities participating with our program. In my work outside the US,

1 I have seen firsthand installations in Sydney Australia, Sao Paulo Brazil and Mexico. I have read
2 reports from many other cities all over the world who are installing LED streetlights.

3 **Q. Have you seen other compilations of LED street light adoption?**

4 A. You have provided us with a database containing URL links to news reports
5 documenting more than 2180 local government units in all 50 states (plus Washington DC,
6 Guam, the Virgin Islands, and the Northern Mariana Islands); and 84 (of 196) countries that
7 have converted or are planning to initiate some conversion to LED street or area lighting. Your
8 database also includes all 13 Canadian provinces and territories plus at least 18 US & Canadian
9 power companies that are moving forward on conversion to LED roadway lighting (Georgia
10 Power, Alliant Energy, CPS Energy (TX), Dakota Electric Cooperative, DTE, FPL, Indiana Municipal
11 Power agency, Kansas City Power & Light, New Brunswick Power, Platte-Clay Electric
12 Cooperative, Portland General Electric, PG&E, Xcel Energy, Seattle City Light, Snohomish County
13 PUD, Westar Energy, Wisconsin Power & Light). Your listing of Power Companies is not
14 exhaustive. The Municipal Solid-State Lighting Consortium has many utility members that are
15 not listed in your spreadsheet.

16 **Q. You listed Los Angeles as a city that has replaced street lights. Please tell us what**
17 **happened there?**

18 A. [Ex. 13, Slide 23] Los Angeles recently completed the replacement of over 150,000
19 streetlights with LED luminaires. Now it is embarking on replacement of post top lights and
20 retrofitting other decorative streetlights. Seattle is expanding its retrofit program to arterial
21 streetlights as well. Seattle completed conversion of 1,800 LEDs on arterial roads in 2013 and

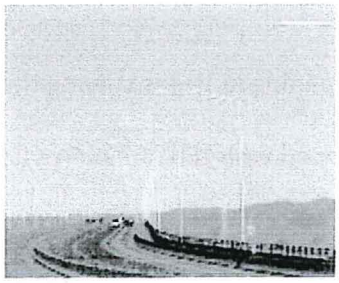
will finish the rest by 2018. In 2019 Seattle will start the conversion to LEDs of decorative, pedestrian and flood lights.

On LA's website as of December 17, 2013, street lighting used to account for up to 40% of Los Angeles' municipal electricity bill. Its recently renovated LED fixtures consume 63.3% less electricity. So, that means big savings for the city. Los Angeles expects to elude $7.7 million in electricity costs and avoid at least $2.5 million in maintenance costs per year.

These details were highlighted in the September 25 live webinar explaining the City of Los Angeles LED Street Lighting Program by Ed Ebrahimian, Director of the Los Angeles Bureau of Street Lighting. More than 540 webinar attendees heard Mr. Ebrahimian recap and answer questions about LA's massive project. A link to an earlier video interview with Mr. Ebrahimian about the program is on the MSSLC website at http://www1.eere.energy.gov/buildings/ssl/consortium-la_video.html .

Q. What is California doing on its highways? Are other state transportation departments looking to LED lighting for their highways?

A. During the summer of 2012, Caltrans began a 24-month program to retrofit 67,000 roadway lights with LEDs. It is targeting 40,000 lights in the California state highway system. The agency is counting on 50% energy savings and extended lifetime of 15-20 years from the products.



San Francisco Dumbarton Bridge

The picture on the left shows where Caltrans retrofitted luminaires on the Dumbarton Bridge over the San Francisco Bay. Caltrans replaced 400W high-pressure sodium (HPS) lights with 183W LED lights. In the State of Washington, the DOT has converted stretches of highway 101 with LED streetlights fitted with smart controls. These controls allow the transportation engineers to turn the lights off during hours when traffic is light or adapt the light levels as warranted by traffic volumes. The state of North Carolina is also in the process of converting its lights to LED as a means to reduce energy and maintenance costs.

Q. Are other cities reducing their lighting budgets?

A. [Ex. 13, Slide 24] Many are. For example, Las Vegas knew the odds were with the house when it took advantage of $840,000 in conservation rebates from the local utility and began to covert 44,000 street lights to LED.

[Ex. 13, Slide 25] Vegas shaved more than $2 million from what it lays out yearly for municipal electricity costs—cutting its street lighting budget by more than half.

Austin, Texas is converting 35,000 streetlights; San Antonio is changing out 20,000. New Orleans is more than a third finished with its conversion of 42,000 cobraheads to LED. Boston began to convert 38,000 HPS and metal halide streetlights to LEDs in 2010. The $18.8 million total project cost of Boston's conversion will produce $50.3 million in energy savings over a 15 year period.

Q. Are small towns betting on LEDs or is what is happening in Vegas staying there?

A. Cody, Wyoming has 1000 LED lights. New poles topped with LED luminaires line Polson, Montana's main street and part of Rimrock road in Billings. Additionally, the U.S. border

1 crossing with Canada at Scobey and Wildhorse, Montana is protected by the superior color
2 rendering LED roadway lighting provides.
3 Other LED cities include Ouray, Colorado, Tuscaloosa, Alabama, Big Bear Lake, Brisbane,
4 and Carpinteria, California, Mountain View, Wyoming, and Greensberg, Kansas, to name a few.
5 While the utility that owns the streetlights in the City of Melbourne Australia will not allow that
6 city to have LED streetlights, the state police academy has converted all of the grounds lighting
7 to LED.
8 [Ex. 13, Slide 26] The Iowa Association of Municipal Utilities took advantage of
9 assistance from the MSSLC to purchase 1,154 LED streetlights in a joint purchase by 15 of its
10 municipal utility members. This joint purchase allowed these participants to receive pricing
11 that was lower than what they would have paid if they had to buy the luminaires on their own
12 in smaller quantities. So, rural towns like Algona, Iowa - population 5,509 - are realizing the
13 same benefits as metropolises, only on a smaller scale, due to well-planned purchasing
14 partnerships and the plummeting cost of LED luminaires.
15 [Ex. 13, Slide 27] This map shows the communities located all over Iowa and the table
16 on the left shows Greenfield purchased 2 lights while Algona bought 422.
17 **Q. What percentage of a small town's electricity use goes to light streets?**
18 A. [Ex. 13, Slide 28] On average for 17 towns in Iowa, 37%. However, you will note that
19 once you remove items that are typically utility fees to customers, this number becomes more
20 than 50%. This is typical.
21 **Q. What payback periods are these towns experiencing?**

A. [Ex. 13, Slide 29] It varies with the energy and O&M costs. Where the cost is 8 cents a kWh as in Algona, energy savings alone paid for the lights in 9.5 years. That's still within the 10-year warranty period. In Auburn, Iowa, where electricity costs 11.8 cents a kWh and some lights could be eliminated from over lit areas, the energy savings (i.e., the payback period) dropped to 2.5 years. You'll also notice the red arrows pointing to Auburn's population of 322 and the $5,140 in energy cost savings. This is the equivalent to a savings of $64 for every household in town when the LEDs are paid for in Auburn, after 2.5 years.

Q. Does the MSSLC provide a financial analysis tool to help communities calculate the costs and benefits of conversion to LED lighting?

A. [Ex. 13, Slide 30] Definitely. It calculates annual energy and energy cost savings, annual maintenance savings, annual greenhouse gas reduction, ROI, simple payback, net present value, and cash flow. This robust Xcel spreadsheet tool is found online at http://www1.eere.energy.gov/buildings/ssl/financial-tool.html

Q. Throughout your testimony you've highlighted some benefits provided by MSSLC. Would you please show us what the online portal to these benefits looks like?

A. [Ex. 13, Slide 31] Certainly. Here you see the link to our financial analysis tool, specifications, and a report on the Iowa buying collaboration.

[Ex. 13, Slide 32] Here are links to our newsletter, material from our forums, objective evaluations of new products, and lessons learned from leading-edge projects.

Q. How much does it cost to join?

A. [Ex. 13, Slide 33] It's free to belong and use anything on the web site. Though there is a small administrative charge for attending workshops.

1 **Q. Who belongs?**

2 A. [Ex. 13, Slide 34] Today MSSLC has 430 members from the 48 states. This slide is
3 outdated, however, so the numbers do not equate with these totals. When this slide was
4 prepared, participation included members from 46 states including 218 municipalities, 63
5 investor-owned utilities, 47 municipally-owned utilities, and 46 non-municipal government
6 agencies. We would like to have participants from Montana.

7 **Q. Please show us a list of some of your members?**

8 A. [Ex. 13, Slide 35] On this slide the yellow arrows point out some non-municipal
9 government members like the Bonneville Power Administration, Argonne National Laboratory
10 and California PUC. The blue arrows point to investor-owned utilities like Alabama Power,
11 American Electric Power and Arizona Public Service. You can also see cities like Honolulu and
12 municipal utilities like Austin Energy and the Central Iowa Power Co-op.

13 **Q. Has MSSLC member Georgia Power installed LEDs?**

14 A. [Ex. 13, Slide 36] Yes. Georgia power owns 854,000 Street and area lights - 74%
15 regulated, 26% unregulated. Recently, GP decided to retrofit all of it lights to LED and this year
16 will begin converting its 450,000 municipal streetlights to LED at no cost to its customers. They
17 ran the numbers and found they can reduce their expense but maintain their profit margin. At
18 its Atlanta headquarters. It cut the wattage used by 55% to get the light quality shown here.

19 [Ex. 13, Slide 37] This slides shows an example of one Georgia Power customer, Lexus of
20 South Atlanta, where the utility replaced one hundred and thirty eight (138) 1000 watt metal
21 halide luminaires with sixty seven (67) 202 watt and fifteen (15) 270 watt LEDs luminaires. This
22 resulted in an 87% reduction in energy.

Q. I notice your presentations mention remote monitoring and adaptive controls systems, what is that?

A. [Ex. 13, Slide 38] Remote monitoring allow us to keep tabs on individual street lights via wireless signals sent to a central management system – much like traffic signal systems found in most major US cities today. These systems also allow for the lighting levels to adapt to current traffic and time of day conditions. It is modeled on this slide where the lights are communicating to a monitoring point. This allows us to see if lights are out or need repair. With remote monitoring, repair personnel can pinpoint outages or malfunctions and improve the scheduling of repairs.

Q. Can one obtain even greater savings by installing motion sensors and the capability to dim lights when illumination is not needed?

A. [Ex. 13, Slide 39] Yes. Earlier I mentioned that a designer typically designs a system for 30% more light than is needed. With an adaptive lighting system, one can "trim" the power over a 10, 15, or 20 year period so the light only receives the power needed. We can increase energy saving by dimming the lights or shutting them off when light is not needed. The MSSLC provides specifications that you see here for remote monitoring systems as well. That may be downloaded at http://www1.eere.energy.gov/buildings/ssl/control-specification.html

Q. Do you know of MSSLC member utilities who allow municipalities to use their poles to house LED luminaires owned by the municipality?

A. [Ex. 13, Slide 40] Yes. Practices vary by utility, but typically, if there was an agreement allowing attachment of the previously standard streetlight owned by the city, I am not aware of any MSSLC member utility that has objected to these being upgraded to LED. Pacific Gas and

Electric, for example, allowed California cities to purchase their own LED street lights and place them on poles owned by the utility if they sign a contract. That allowed the cities to use federal Economic Recovery Act funding earmarked for energy conservation purchase light replacements that not only conserved energy, but reduced municipal lighting budgets as well.

The street lighting tariff may include a charge for customer-owned luminaires on utility-owned poles, known as energy only. If there are stranded costs, meaning the poles and existing luminaires have not yet been fully paid for, some agreements allow these costs to be rolled into the new tariff or covered upfront by the customer. PG&E has the following wording at page 15 of its LS-2 tariff:

> 13. POLE CONTACT AGREEMENT: Where Customer requests to have a portion or all Customer owned street lighting facilities in contact with PG&E's distribution poles, a Customer-Owned Streetlights PG&E Pole Contact Agreement (Form 79 938) will be required.

Attorney Motion: We move admission of Complainants' Exhibit 13.

Q. Is it necessary to meter energy usage of LED street lights?

A. No. The vast majority of HPS lights are billed pursuant to unmetered tariffs called flat rates. This is also typical for the majority of LED streetlight installations I am aware of.

Q. Is it difficult to construct an unmetered tariff?

A. No. This is standard industry practice and can be accomplished in the same manner as done for HID lights. Many utilities calculate their street lighting flat rate by multiplying dusk to dawn operating hours by kWh energy use, and then by the kWh rate. See for example Pacific Gas & Electric's (PG&E's) tariff at

http://www.pge.com/tariffs/tm2/pdf/ELEC_SCHEDS_LS-1.pdf (for utility-owned lights) and

http://www.pge.com/tariffs/tm2/pdf/ELEC_SCHEDS_LS-2.pdf (for customer-owned lights).

That tariff has unmetered rates for several specific types of equipment including LED technology, high and low pressure sodium, metal halide, incandescent, mercury vapor, and induction lighting.

That tariff sets out the following formula for determining monthly energy charge per lamp: "Monthly energy charges per lamp are calculated using the following formula: (Lamp wattage + ballast wattage) x 4,100 hours/12 months/1000 x streetlight energy rate per kilowatt hour (kWh). Ballast wattage = ballast factor x lamp wattage."

If a utility requires a LED street light and ballast to test, it may accept the test if the LED lighting manufacturer provides IES files and wattage tests of luminaires done by independent testing laboratories. Most LED street light manufacturers will be able to supply the needed data.

If a utility insists on testing for itself, the test shouldn't take long. It can just hook the luminaire to power with a metering device in the loop to verify the rated wattage. We did this in Seattle and found independent testing laboratory reports to be reliable.

You can find LEDs that have been tested and pre-certified for rebates by PG&E at:

http://www.aesc-inc.com/download/SPC/2011SPCDocs/UnifiedManual/App%20E%20Approved%20LED%20Lighting.pdf

Q. You've mentioned Los Angeles as being the largest installation of LED street lights, will that be surpassed soon?

A. Yes. New York City announced in October of 2013 that it is expanding its pilot program to install a quarter of a million LED street lights. It will become the largest roadway lighting overhaul in the country. When the project is completed in 2017, the city is expected to save $14 million a year when combining a $6 million reduction in energy costs and $8 million in savings through maintenance costs.[1]

Also, as mentioned, Georgia Power has decided to convert all 854,000 of it lights to LED over the next 5 to 10 years. They began in 2013.

Q. At your MSSLC conference on September 11, 2013, I asked Margaret Newman, who was presenting on LED lighting in New York, whether the existing LEDs had been able to maintain their mounting on the poles there during the hurricane that had recently hit New York. Do you recall her answer?

A. She said the poles held up in those high winds.

Q. Do you know of any other states where utility regulators are considering petitions concerning the adoption of LED street lighting?

A. Yes. As I've mentioned, the Municipal Solid-State Lighting Consortium frequently publishes an E-newsletter where we feature a few links to LEDs in the news. In January, 2014, we noted a petition pending before the New Hampshire Public Utilities Commission. There, a local utility, Public Service of New Hampshire, petitioned to establish a new rate for the LED

[1] http://www.energybiz.com/article/14/01/new-york-city-takes-250000-steps-toward-energy-efficiency?utm_source=January+2014&utm_campaign=October+Newsletter&utm_medium=email

1 lights as part of its street lighting service for government entities. The city of Manchester voted
2 to spend $25,000 to hire an attorney to intervene in the case.[2]
3 In the states of Rhode Island and Massachusetts, state law makers passed legislation
4 mandating utilities sell their street lighting business to cities who wanted LED streetlights. [3]
5 A bill being considered in California would legislate that utility-owned street light poles,
6 whose electricity use is paid by local governments, be converted to use cost-effective
7 technology [LED] that reduces electricity consumption and may achieve lower utility bills[4]
8 **Q. Mr. Smalley, we appreciate your sharing your knowledge of LED street lighting with**
9 **us. Thank you.**
10 A. I appreciate the interest of your Commission, its staff and the citizens of Montana in
11 my testimony. It is nice to see utility commissions working with cities and their utility partners
12 as stewards of the public trust.
13
14 I, Edward Smalley, do hereby certify that these 23 pages of typewritten material are a
15 full, correct, and truthful rendition of my pre-filed written testimony given under oath.
16

[2] http://www.unionleader.com/article/20131223/NEWS06/131229749?utm_source=January+2014&utm_campaign=October+Newsletter&utm_medium=email
[3] http://www.rilin.state.ri.us/pressrelease/Lists/oped/DispForm.aspx?ID=15
[4] http://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201320140AB719

Edward Smalley

Edward Smalley

State of Washington
County of King County
Signed and sworn to before me on April 7, 2014 by Edward Smalley.

Ellen Marie Javines

Notary

ELLEN MARIE JAVINES
COMMISSION EXPIRES
NOTARY
PUBLIC
JUNE 30, 2014
STATE OF WASHINGTON

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COMPLAINANTS' EXHIBIT 13 (Witness: Edward Smalley)
in
Gruba and Barsanti v. NorthWestern Energy,
Montana Public Service Commission Docket No. D2010.2.14
Tentative Hearing Date: September 8, 2014
Adapted from the following & other presentations:

Municipal Solid-State STREET LIGHTING CONSORTIUM — U.S. Department of Energy

2013 National League of Cities Congress of Cities Mobile Workshop

LED Street Lighting Conversion
Saving Your Community Money, While Improving Public Safety

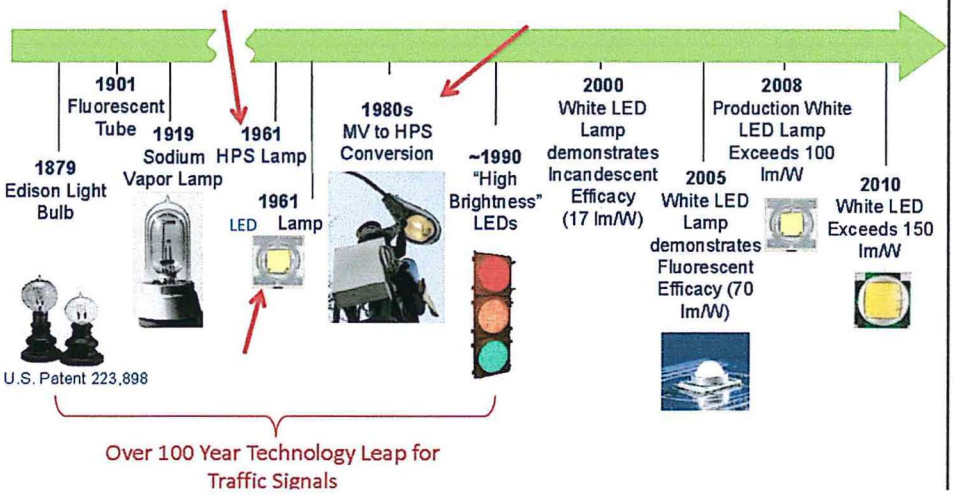
November 13, 2013

State of LED Streetlight Adoption in U.S.

Edward Smalley, Director
Municipal Solid-State Street Lighting Consortium
Seattle City Light | City of Seattle
700 Fifth Ave., Suite 3200 | P.O. Box 34023 | Seattle, WA 98124-4023
Office: (206)386-1571 | Edward.Smalley@Seattle.gov

Municipal Solid-State STREET LIGHTING CONSORTIUM — Sponsored by the U.S. Department of Energy

Technology on the Move…



Municipal Solid-State STREET LIGHTING CONSORTIUM

U.S. Department of Energy

Streetlights in America

Background

- Streetlights in the U.S.: 26.5 million (some reports as high as 44M)
- Energy Consumption Equivalent: 1.9 million households
- Greenhouse Gas Emissions Equivalent: 2.6 million cars.
- Energy Only Costs: **$2 billion per year**
- Operation & Maintenance Costs: **$4-6 billion/year**
- Funded by: 90% public taxes | 10% Coops/other
- Ownership: 60%+ Private/Investor Owned Utilities
- Average Luminaire Age: 25 years old
- Technology Used: 80% HPS | 10% MH | 5% MV | 5% other
- Technology Age: 90+ years old!

D2010.2.14, Complainants' Exhibit 13, 3

Difficulty maintaining a fully operating system

- Slow repair response to streetlight failures
  - Up to 4 months to respond to one streetlight
- At one point, there were 5,000 trouble tickets in queue
  - Hence the scheduled re-lamping every 4 years
- Installed fixtures exceeded design life
  - Caused ballast inefficiency
  - Affected light output

Seattle City Light

D2010.2.14, Complainants' Exhibit 13, 4

Establish a process to evaluate fixtures

1. Specify design requirements
2. Datasheet/test report evaluation
3. Sample request
4. Fixture/housing analysis | Mock-up
5. In-situ light level evaluation

Seattle City Light

Municipal Solid-State STREET LIGHTING CONSORTIUM

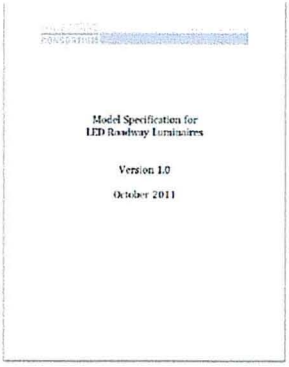
U.S. Department of Energy

Resources Available

Model Specification for LED Roadway Luminaires

Scope

- Municipalities, utilities, large public spaces, etc.
- Streets, roadways, and nearby pedestrian ways
- Initial and maintained quality and quantity of illumination
- Warranty coverage
- Input power, electrical immunity, housing finish, vibration, etc.
- Drivers, including lighting controls interface
- Photocontrol receptacles


Model Specification for
LED Roadway Luminaires

Version 1.0

October 2011

Download: http://www1.eere.energy.gov/buildings/ssl/specification.html

Municipal Solid-State STREET LIGHTING CONSORTIUM

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Model Luminaire Spec – Where Used

In 2012, the model specification webpage on the SSL website was visited more than 20,000 times, and the specification was downloaded more than 3,500 times. Some users include:

Seattle City Light (used to purchase 15,000 LED streetlights in 2013)	Iowa Association of Municipal Utilities
State of Wisconsin	State of Minnesota
State of Colorado	City of Philadelphia
City of Kansas City, MO	City of Sacramento, CA
Portland General Electric	Puerto Rico (PREPA)
Hawaii	New Orleans, LA
City of Independence, MO	

D2010.2.14, Complainants' Exhibit 13, 7

1. **Specify design requirements**
2. Datasheet/test report evaluation
3. Sample request
4. Fixture/housing analysis | Mock-up
5. In-situ light level evaluation

- Long-term support of luminaires is a major factor in decision-making
- Weeds out in-home manufacturers
- Identifies the big-players
  - Fixture quality
  - Warranty support

Fixture count: **30**

Seattle City Light

D2010.2.14, Complainants' Exhibit 13, 8

1. Specify design requirements
2. **Datasheet/test report evaluation**
3. Sample request
4. Fixture/housing analysis | Mock-up
5. In-situ light level evaluation

- Created a tracking spreadsheet listing all LED fixtures received
- Compare characteristics to eliminate undesired fixtures

Fixture count: **10**

Seattle City Light

D2010.2.14, Complainants' Exhibit 13, 9

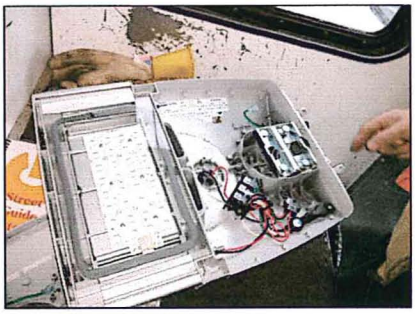
1. Specify design requirements
2. Datasheet/test report evaluation
3. **Sample request**
4. **Fixture/housing analysis | Mock-up**
5. In-situ light level evaluation

Fixture count: **10**

Seattle City Light

D2010.2.14, Complainants' Exhibit 13, 10

1. Specify design requirements
2. Datasheet/test report evaluation
3. **Sample request**
4. **Fixture/housing analysis | Mock-up**
5. In-situ light level evaluation



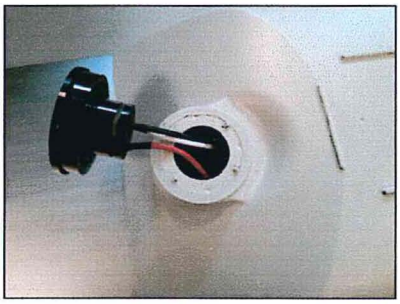
- Lab study to confirm light-level claims
- Evaluate each fixture for handling issues

Fixture count: **10**

Seattle City Light

D2010.2.14, Complainants' Exhibit 13, 11

1. Specify design requirements
2. Datasheet/test report evaluation
3. **Sample request**
4. **Fixture/housing analysis | Mock-up**
5. In-situ light level evaluation



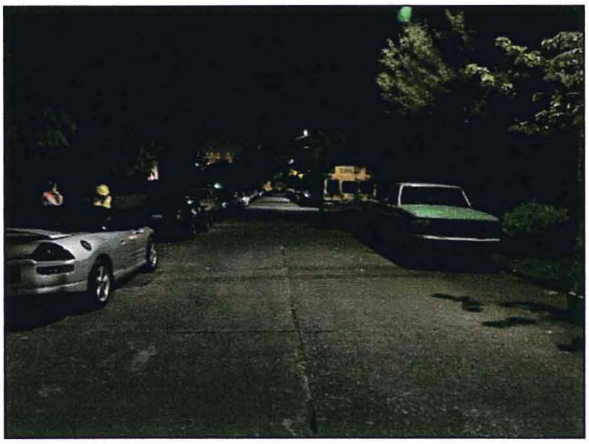
Fixture count: **3**

Seattle City Light

D2010.2.14, Complainants' Exhibit 13, 12

1. Specify design requirements
2. Datasheet/test report evaluation
3. Sample request
4. Fixture/housing analysis | Mock-up

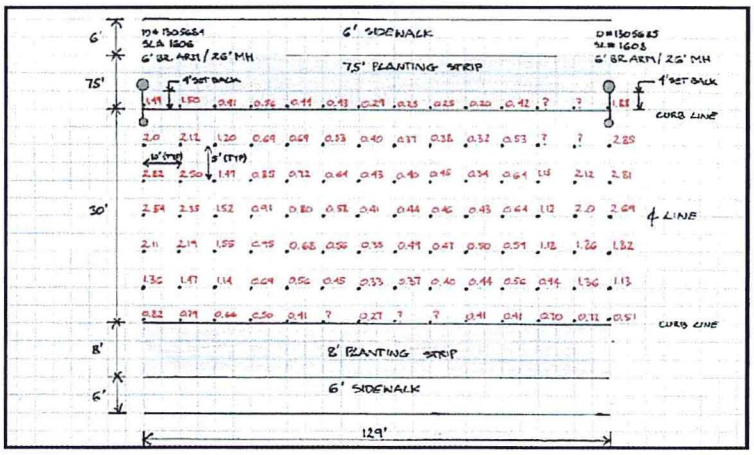
5. In-situ light level evaluation



Seattle City Light

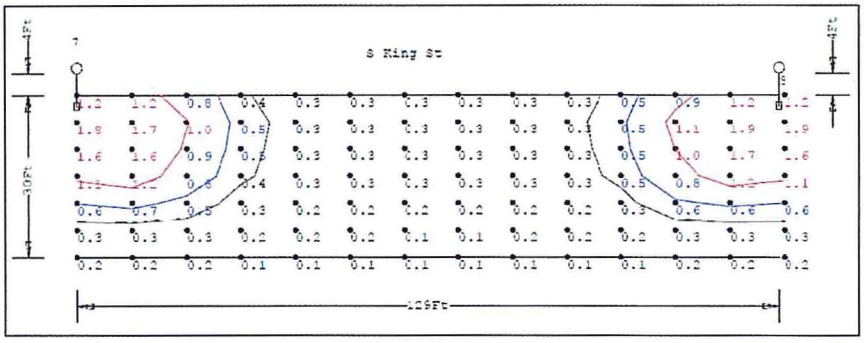
1. Specify design requirements
2. Datasheet/test report evaluation
3. Sample request
4. Fixture/housing analysis | Mock-up

5. In-situ light level evaluation



Seattle City Light

1. Specify design requirements
2. Datasheet/test report evaluation
3. Sample request
4. Fixture/housing analysis | Mock-up
5. **In-situ light level evaluation**



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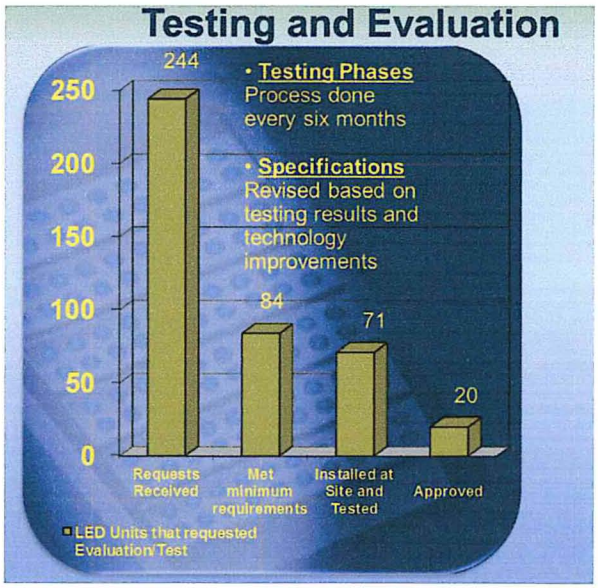
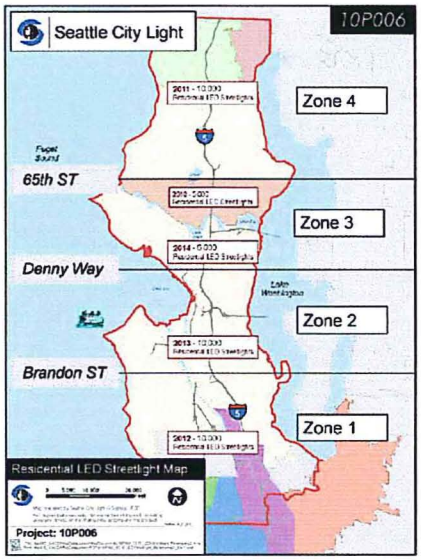
Benefit from testing done by MSSLC participants.

(Of 244 luminaires LA tested, 20 street lights approved)

Approved LED units listed @: http://bsl.lacity.org/led-contractors-vendors.html

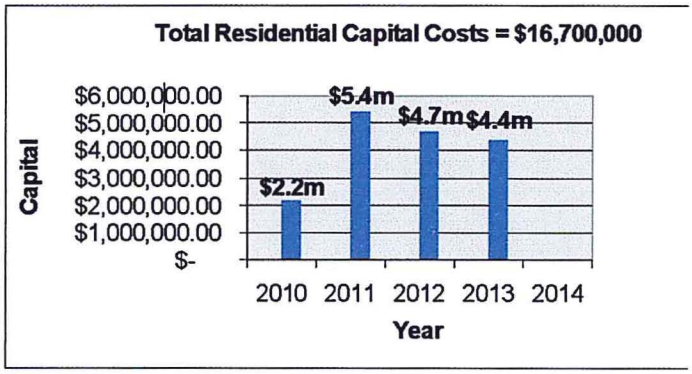


41,000 Total Residential LED Streetlights Converted



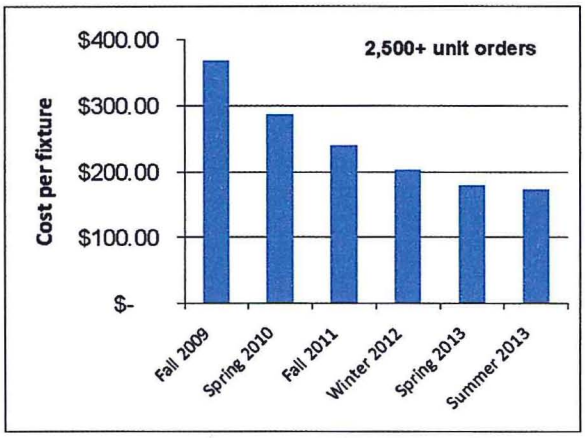
Seattle City Light

Investment on Residential System



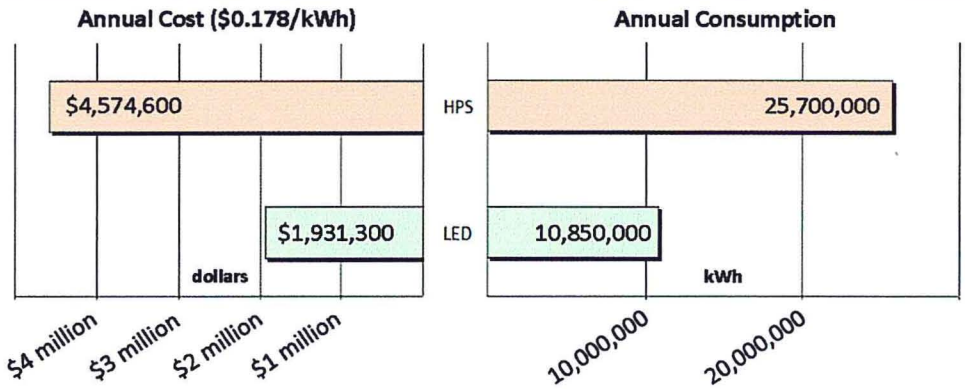
Seattle City Light

LED fixture costs has decreased by half in 4 years (Residential Lights)



Seattle City Light

D2010.2.14, Complainants' Exhibit 13, 19



$2,643,300 savings

14,850,000 kWh savings

Seattle City Light

D2010.2.14, Complainants' Exhibit 13, 20

Current status of the residential LED program

- Residential payback = **7.5 years**
- Current <u>averaged</u> energy reduction > **57%**
- Manufacturer warranty extended to **10 years**

- Lower volume of complaints due to LED conversion

Seattle City Light

Municipal Solid-State STREET LIGHTING CONSORTIUM

U.S. Department of Energy

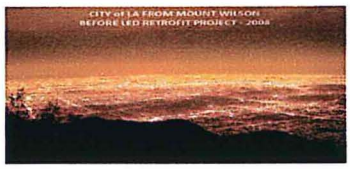
LED Streetlights Adoption

- Today - **Over 600 U.S. Cities** have either installed or plan to install LED streetlights!
- Major cities include:
  - Los Angeles – 147,000
  - Seattle – 41,000
  - Boston – 32,000
  - Las Vegas – 40,000
  - NYC, San Francisco, Oakland, San Antonio, Portland, DC and others…

Los Angeles replaced 150,000+ street lights with Dark Sky Association approved LEDs

141,089+ cobraheads replaced, LA now is beginning to replace poll-top lights.

L.A. from Mt. Wilson - 1988



L.A. from Mt. Wilson - 2012

*63.3% energy saving;
*$7.7 million/yr. in avoided energy charges;
*$2.5 million/yr. in reduced maintenance;
*eliminated need for 86.58 GWh of electricity each year;
*equal to reducing the carbon emissions from 10,000 cars.

Reduced light pollution in night sky

D2010.2.14, Complainants' Exhibit 13, 23

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Las Vegas

- Population: 606,000
- Total Streetlights: 55,000
- Project scope: 44,000 standard streetlights to LED
  - To Date: 40,000
- Project Cost to Date: $16M
- Conservation Rebates: $840k ($21 per luminaire)

D2010.2.14, Complainants' Exhibit 13, 24

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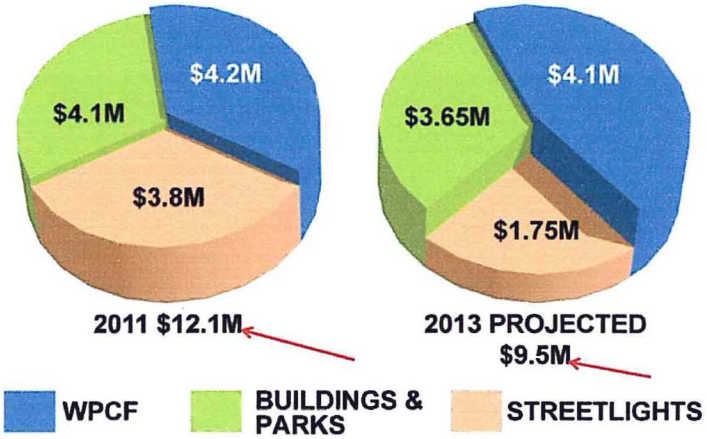
Las Vegas

CITY ELECTRICAL CONSUMPTION IN DOLLARS



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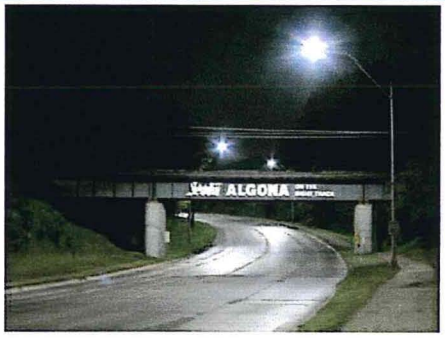
Small Groups

The **Iowa Association of Municipal Utilities** used Consortium assistance to leverage the buying power of 15 small municipalities with a joint purchase and competitive bid process to buy 1,154 streetlights.



"The available resources were essential in facilitating the process on behalf of these communities. . . . the model specification, and guidance of key personnel at the DOE Municipal Solid-State Street Lighting Consortium played a critical role in our process."

– Jonathan Roberts, Iowa Association of Municipal Utilities

D2010.2.14, Complainants' Exhibit 13, 26

Municipal Solid-State
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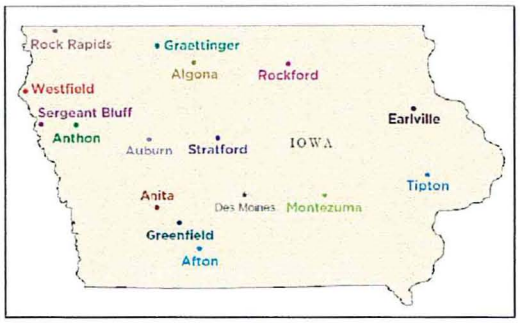
Iowa Association of Municipal Utilities

Purchase Volume by Town with Energy Savings Estimates

Community	Number Purchased	Annual Estimated Energy Savings (kWh)
Greenfield	2	736
Anthon	13	4,568
Afton	20	6,745
Earlville	30	11,038
Rockford	38	12,816
Stratford	32	12,847
Westfield	40	13,490
Graettinger	32	16,372
Montezuma	41	21,370
Auburn	24	37,843
Tipton	105	42,035
Sergeant Bluff	87	45,346
Anita	138	49,547
Rock Rapids	130	67,759
Algona	422	207,231
Total	1,154	549,743



Fifteen Iowa municipalities joined forces to buy LED streetlights to work toward achieving their energy efficiency goals. Regardless of size, all benefited from joint purchasing and financing.

D2010.2.14, Complainants' Exhibit 13, 27

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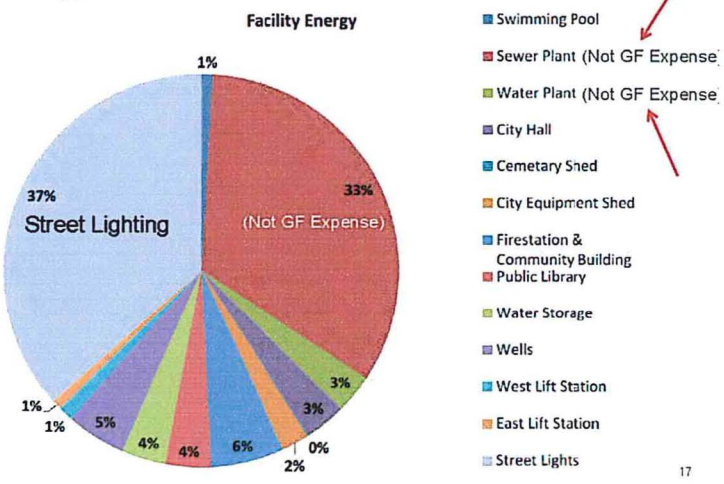
U.S. Department of Energy

Potential Energy Reductions

Typical of 17 Small Towns in IOWA



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Iowa Association of Municipal Utilities

LED Retrofit Financial Summary	Auburn, Iowa	Montezuma, Iowa	Algona, Iowa
Population:	*322*	*1,462*	*5,560*
Total Costs:	$12,420	$28,930	$272,360
Total LED fixtures in project:	24	41	422
Monthly kWh savings:	3,150	1,790	17,320
Monthly energy cost savings:	$430	$320	$2,380
Annual kWh savings:	37,820	21,440	207,810
Annual energy cost savings:	$5,140	$3,800	$28,580
Estimated lifetime kWh savings*:	567,320	321,560	3,117,130
Estimated lifetime energy cost savings:	$77,150	$56,990	$428,730
Simple return on investment (ROI):	5.2**	1.0	0.6
Estimated payback period (energy & maintenance)	2.4 years	7.6 years	9.5 years
Estimates based on rate:	*$0.118/kWh*	*$0.107/kWh*	*$0.080/kWh*

Financial figures rounded to nearest $10
**Financial analysis period is 15 years*
***Auburn was initially over-lit. It required significantly fewer LED replacements, which resulted in unusually high ROI*

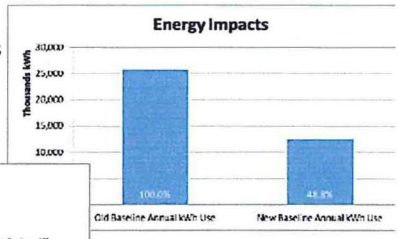
Municipal Solid-State STREET LIGHTING CONSORTIUM

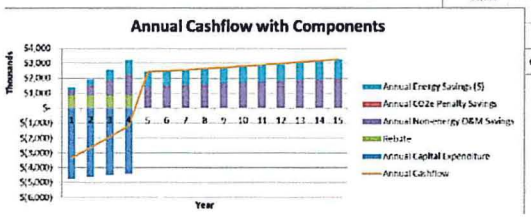
U.S. Department of Energy

Resources – Financial Analysis Tool

Retrofit Financial Analysis Tool

- Evaluates costs and benefits of LED conversion
- Performs detailed analysis and provides numerous outputs, including:
  - Annual energy and energy-cost savings
  - Annual maintenance savings
  - Annual greenhouse gas reductions
  - Simple payback, IRR
  - Net present value





LED Lighting Facts
CALIPER Program
Standards Development
Technical Information Network
Gateway Demonstrations
Municipal Consortium
About the Consortium
FAQs
Members
News and Events
Resources
Design Competitions

Outdoor Lighting Resources

DOE offers a variety of resources to guide municipalities, utilities, and others in their evaluation of LED street lighting products.

The following documents are available as Adobe Acrobat PDFs. Download Adobe Reader.

Read the DOE review of the Lighting Research Center's Specifier Report on Streetlights for Collector Roads.

Tools

Tools assist users with project planning and analysis.

- *Retrofit Financial Analysis Tool*
  The Retrofit Financial Analysis Tool provides municipalities, utilities, and other organizations a method of analyzing the cost and return-on-investment from lighting efficiency projects.

Published Specifications

Specifications help determine appropriate performance characteristics for a particular lighting application.

- *Model Specification for Adaptive Control and Remote Monitoring of LED Roadway Luminaires*
  The DOE Municipal Solid-State Street Lighting Consortium's Model Specification for Adaptive Control and Remote Monitoring of LED Roadway Luminaires helps cities, utilities, and other local agencies accelerate their adoption of systems that can further reduce the energy and maintenance costs of operating their streetlights.
- *Model Specification for LED Roadway Luminaires*
  The DOE Municipal Solid-State Street Lighting Consortium's Model Specification for LED Roadway Luminaires enables cities, utilities, and other local agencies to assemble effective bid documents for LED street lighting products.
- The Better Buildings Alliance (BBA) specifications below provide guidance and minimum performance requ...
  - *BBA High-Efficiency Parking Structure Lighting Specification*
    Presents performance specifications for converting traditional HID parking structure lighting technology to high-efficiency alternative technologies.
  - *BBA LED Site (Parking Lot) Lighting Specification*
    Describes product performance specifications and evaluation procedures for using LED lighting in retail parking lots.

Technology Fact Sheets

Technology fact sheets describe solid-state lighting, its characteristics and applications, and issues related to successful market introduction.

- *Establishing LED Equivalency*
  Guidance for comparing products based on LED or other light source technologies.
- *Understanding LM-79 Reports*
  Discusses typical content of laboratory reports summarizing LM-79 test results for integrated SSL lamps and luminaires.

White Papers

White papers explore critical issues that impact SSL technology and market adoption.

- *Light at Night: The Latest Science*
  Update on current research related to nighttime exposure to light.

SSL Implementation Briefs

SSL Implementation Briefs examine the experiences of municipalities as they investigate and adopt LED street lighting technology.

- *Iowa Municipalities Unite to Save Energy with LED Street Lighting*
  Describes the collaborative effort of 15 Iowa towns and cities to upgrade their streetlights to LED.

Financial Tool to analyze ROI when retrofitting with LEDs

Model Bid Specifications for issuing LED RFPs

Buying Group collaborations to reduce costs

D2010.2.14, Complainants' Exhibit 13, 31

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Solid-State Lighting

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DOE Municipal Solid-State Street Lighting Consortium

Municipal Solid-State STREET LIGHTING CONSORTIUM

The DOE Municipal Solid-State Street Lighting Consortium shares technical information and experiences related to LED street and area lighting demonstrations and serves as an objective resource for evaluating new products on the market intended for those applications. Cities, power providers, and others who invest in street and area lighting are invited to join the Consortium and share their experiences. The goal is to build a repository of valuable field experience and data that will significantly accelerate the learning curve for buying and implementing high-quality, energy-efficient LED lighting. Consortium members are part of an international knowledge base and peer group, receive updates on Consortium tools and resources, receive the Consortium E-Newsletter, and help steer the work of the Consortium by participating on a committee. Learn more about the Consortium.

Lessons from Leading-Edge Projects

Watch this video to learn how the City of Los Angeles installed more than 141,000 LED streetlights – cutting energy use by 63% and saving the city $7 million a year in electricity costs. For more details on LED street lighting programs in small, medium, and large cities, view the Member Case Study webinar, or check out *The Light Post* archives.

National Street Lighting Inventory

The Municipal Solid-State Street Lighting Consortium seeks to develop an inventory of the nation's street and highway lighting systems by collecting a large sample of information from municipalities, utilities, and other operators. This effort will enable the development of national and local policies and programs to support the implementation of LED streetlights, and help identify the major opportunities for conservation efforts. Please join your peers and participate in the MSSLC National Street Lighting Inventory.

MEMBERSHIP

Consortium Membership is free and open to municipalities, utilities, and energy efficiency organizations, with participation at various levels from other interested parties.

- For those buying, using, or considering

RESOURCES

DOE and the Consortium offer a variety of outdoor lighting resources to guide municipalities, utilities, and others in their evaluation of LED street lighting products.

- LED Street Lighting: Kansas City Demonstration Report

NEWS AND EVENTS

The Consortium shares best practices and lessons learned through national and regional meetings, webcasts, web-based discussion forums, and other means.

- Attend the City of Los Angeles LED Street Lighting Program webinar

An objective evaluator of new products

E-Newsletter & updates on Consortium tools & resources

Meetings, webcasts & forums

Lessons from Leading – Edge Projects

D2010.2.14, Complainants' Exhibit 13, 32

✓ IT'S FREE – NO FEE TO PARTICIPATE

MSSLC'S A PATH TO:

*MONEY & ENERGY SAVED

*BETTER LIGHTING

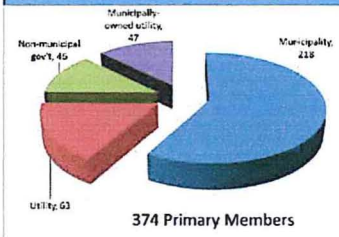
D2010.2.14, Complainants' Exhibit 13, 33

Municipal Solid-State STREET LIGHTING CONSORTIUM

U.S. Department of Energy

Available Assistance

- The MSSLC itself is a great resource!
  - 374 member orgs
  - User-focused
  - Purpose is sharing information and tools
  - Membership is free but not required for access to most materials



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Municipal Solid-State STREET LIGHTING CONSORTIUM

Sponsored by the U.S. Department of Energy

U.S. Primary Participant Organizations	City	State	Organization Type
Alabama Power Company	Birmingham	Al	Utility
Alameda Municipal Power	Alameda		Municipality
Alliant Energy	Cedar Rapids		tility
Alliant Techsystems			on-Municipal Government
American Electric Power			tility
Anchorage Municipal Light & Power	A		Municipally-Owned Utility
Appalachian Power - American Electric Power	Charles		tility
Argonne National Laboratory	Argonne		on-Municipal Government
Arizona Public Service Co	Phoenix		tility
Austin Energy	Austin		tility
Bonneville Power Administration	Seattle		on-Municipal Government
Borough of Ellwood City	Ellwood City		Municipally-Owned Utility
Borough of St Lawrence	Reading		Municipality
Bryan Municipal Utilities	Bryan		Municipality
Burlington Electric Department	Burlington		Municipally-Owned Utility
Burlington Electric Department	Burlington		Municipally Owned utility
California Public Utilities Commission.pdf	San Francisco		on-Municipal Government
Cambridge Community Development Dept	Cambridge		Municipality
Central Iowa Power Cooperative	Cedar Rapids		Utility
Chicago Transit Authority	Chicago	IL	Non-Municipal Government
City and County of Broomfield	Broomfield	CO	Municipality
City and County of Honolulu	Honolulu	HI	Municipality

Learn from Government Agencies, and Private & Public Power Company's who have become MSSLC participants

D2010.2.14, Complainants' Exhibit 13, 35

Municipal Solid-State STREET LIGHTING CONSORTIUM

U.S. Department of Energy

Consortium Member Georgia Power

Georgia Power Atlanta Headquarters

Before with HID: 16,950 watts
57 Units

After LED system: 7,482 watts
57 Units
Color Temperature: 4000K | CRI: 70

D2010.2.14, Complainants' Exhibit 13, 36

Municipal Solid-State STREET LIGHTING CONSORTIUM

U.S. Department of Energy

Georgia Power Customer

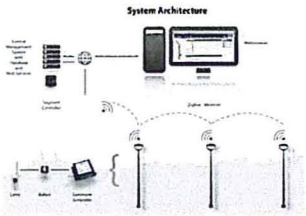
LEXUS of South Atlanta – Union City GA 30291

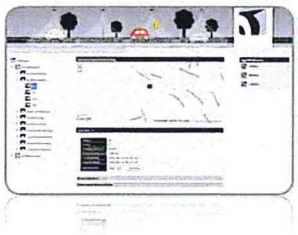
Before with HID: 138,000 watts
(138 1000-watt metal halide fixtures)

After LED system: 17,584 watts
67 202 - watt fixtures = 13,534 watts
15 270 - watt fixtures = 4,050 watts
Color Temperature: 4000K | CRI: 70

D2010.2.14, Complainants' Exhibit 13, 37

- Remote monitoring system
- Adaptive controls
- Unique controls for different users





Seattle City Light

D2010.2.14, Complainants' Exhibit 13, 38

Municipal Solid-State
STREET LIGHTING
CONSORTIUM

U.S. Department of Energy

Resources - Model Controls Spec

Model Specification for Adaptive Control and Remote Monitoring of LED Roadway Luminaires

Released: April 16, 2013 – V 1.0

Download at:

www.ssl.energy.gov/consortium.html

Model Specification for
Adaptive Control and Remote Monitoring of
LED Roadway Luminaires

Version: 1.0

Prepared by:
MSSLC Adaptive Control and Remote Monitoring Committee

Posted: April 16, 2013

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CITY-OWNED, ENERGY EFFICIENT LUMINAIRES ARE BEING PLACED ON POLES OWNED BY PG&E & DTE

Some utilities will allow their poles to house new luminaires owned by a city. If the poles and old style luminaires have not yet been fully paid for, there may be a slight charge for pole use until the cost of the poles and existing light fixtures has been defrayed.

MSSLC member, PG&E, allows cities to use their poles if they sign a contract. For example, PG&E has the following wording at page 15 of its LS-2 tariff :

"13. POLE CONTACT AGREEMENT: Where Customer requests to have a portion or all Customer owned street lighting facilities in contact with PG&E's distribution poles, a Customer-Owned Streetlights PG&E Pole Contact Agreement (Form 79-938) will be required."

PG&E Pole-use Contract

D2010.2.14, Complainants' Exhibit 13, 40