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– SEE PAGE 45

At an LED bulb replacement location in Van Nuys are (below, from left) Palani Segee, Acting Assistant Division Manager, 30 years of City service, Club Member, and Jim Quigley, Street Lighting Engineer and Project Manager, 21 years, Club Member. In back: Alex Cardenas, Electrician, 4 years (in the bucket) and Brandon Lacy, Electrical Craft Helper, 1 year, Club Member.

In a Public Works New Light

Street Lighting's LED replacement project is winning awards, saving millions and brightening up the City's streets.

– SEE PAGE 24

87 LED

Alive! photo by Angel Gomez

City Employees Club of Los Angeles
120 West 2nd Street
Los Angeles, CA 90012

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See all the race action

Baker to Vegas!

ALIVE! FEATURE

Photos by Angel Gomez, Club Sales Director, and courtesy Public Works

Public Works/
Street Lighting

In a New Light

Street Lighting's LED replacement project is winning awards, saving millions and brightening up the City's streets.

If the streets of Los Angeles are looking a lot brighter, you're not seeing things. Well, actually, you are – you're seeing the results of one of LA's most successful recent programs, replacing all of the high-pressure sodium orange lighting (previous technology) with super-bright and efficient LED bulbs.

If you look up at the City's more than 140,000 lighting fixtures (just don't stare too long), you'll see that most have been replaced with the sleek, white-light LEDs.

Just as important as brightness and color are the savings – millions of dollars in energy, according to officials.

"The importance of the LED Conversion Program cannot be overstated," said Ed Ebrahimian, Director, Street Lighting, and Club Member. "It is a shining example of how green technology can be both environmentally responsible and cost-effective.

"With the LED program, we have transformed the night landscape of the City of Los Angeles, made our City safer and pedestrian-friendly at night, and have exceeded our initial program goals on both energy efficiency and CO_2 reductions.

"Angelenos have embraced the new white LED light, as we have received many positive comments from citizens, community groups, the LAPD and even the Dark Skies Association for the reduced sky glow at night, reduced light pollution and trespass.

"We have gained national and international acclaim by leading the way with our LED program, which has become a model program and example for a lot of cities as we continue to get recognition and inquiries from municipalities and utilities around the world."

During an LED retrofit are, from left: Palani Segee, Acting Assistant Division Manager, 30 years of City service, Club Member; Jim Quigley, Street Lighting Engineer and Project Manager, 21 years, Club Member; and *Alive!* editor John Barnes.

History

In September 2009, Public Works/Street Lighting began implementing the LED program, which replaced 140,000 existing street lights with the far more efficient LED units. The program was initiated to allow Street Lighting to continue delivering street lighting services:

- To reduce the City's costs in both energy and maintenance, and
- To reduce the City's carbon footprint by reducing the use of electricity.

Initially the retrofit program was to span five years, but at the instruction of Mayor Antonio Villaraigosa, Public Works began an acceleration so as to complete the conversion of the 140,000 lights by June 2013. This cut one year from the schedule, making the original five-year program a four-year program.

Response from the community and law enforcement has been extremely positive.

This program and its results have made the City of Los Angeles a model for other cities around the globe that are interested in emulating the City's retrofit methods. Public Works receives many phone calls and e-mails from municipalities seeking guidance and information.

Public Works reports that the actual number of fixtures retrofitted is more than 155,000.

Phase Two

As a part of the budget process for the next fiscal year, Street Lighting has put together a package to address decorative fixtures and other special lighting in the City that will require intensive design and research because of the sheer volume and diversity of the lighting equipment in the City of Los Angeles. That work is beginning now.

For more information, see the rest of this feature story, or go to:

www.bsl.lacity.org/led.html

Above, from left: Brandon Lacy, Electrical Craft Helper, 1 year of City service, Club Member, and Alex Cardenas, Electrician, 4 years. They're holding an old sodium light source and a new LED array. At left: Alex Cardenas in the bucket.

Alex Cardenas, Electrician, 4 years of City service, unboxes an LED array before installing it.

That's a Winner

Public Works/Street Lighting's LED retrofit project has gained national and international acclaim and has become a model for cities and utilities across the world. It has been recognized by a number of different groups, including:

U.S. Department of Energy

Harvard Kennedy School's "Bright Ideas for Innovations in Government"

Conference of U.S. Mayors' "Climate Protection Award"

LUCI Association "Best Initiative in Sustainable Urban Lighting"

Forbes, and

numerous engineering and lighting publications.

LED LIGHTING

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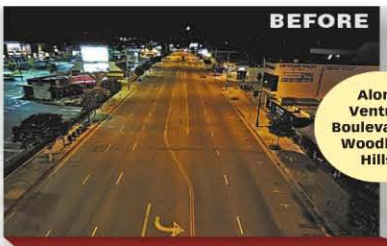
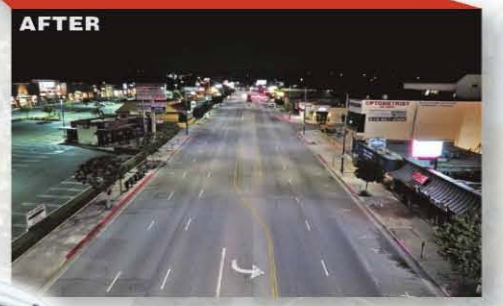
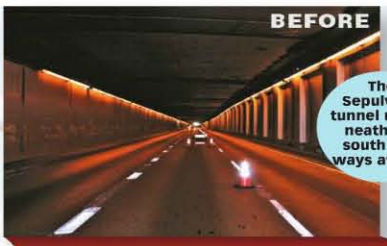
Before and After

Here are some before-and-after views that demonstrate the difference in light color and brightness between the old technology (high-pressure sodium, casting the familiar orange glow) and the bluish-white clarity of the new LED bulbs.



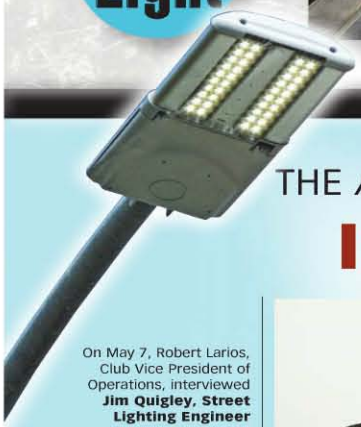
Along Ventura Boulevard in Woodland Hills.





The Sepulveda tunnel underneath the south runways at LAX.

In a New Light



THE *ALIVE!* INTERVIEW

Innovation Burns Bright

On May 7, Robert Larios, Club Vice President of Operations, interviewed **Jim Quigley, Street Lighting Engineer** and manager of the LED replacement project, Public Works/Street Lighting, 21 years of City service, Club Member. The interview took place in Street Lighting's conference room in its downtown headquarters.

Jim Quigley, Street Lighting Engineer, LED retrofit program manager, Club Member, 21 years of City service.

***Alive!*: Hi Jim, what's your history with the City?**

JIM QUIGLEY: Well, I've been working for the Bureau of Street Lighting for 21 years, and one of the really great things about working here is that you get the opportunity to transfer and rotate around through all of the programs that the Bureau has. So after a certain number of years I'd managed to go through all of the programs – design, construction, bid and award, grant funding, etc. And after that time I was familiar with every facet of our operations. I took advantage of that opportunity and it's been great. I have a Master's degree in electrical engineering. Before coming to the City I spent about ten years working in construction doing electrical work.

So when the LED retrofit project manager position opened up, I was fortunate enough to be selected for this. Frankly the opportunity to choose, test, evaluate and then install and review the performance of this cutting-edge-type technology is a dream job for an engineer. I consider myself very fortunate to have this opportunity, and it's been great so far.

You're sticking with this through Phase Two?

JIM: Absolutely.

About the Project

Describe your roles and responsibilities with the LED bulb replacement project.

JIM: Sure. The LED replacement program is under the purview of the New Technology and Energy Efficiency Division, the division that I manage. It incorporates this whole concept of the LED. There are two separate engineering functions that our division is responsible for – one is the testing and evaluation of new LED equipment, and the second is the replacement plans.

Almost like mapping?

JIM: It is like mapping, but it's a lot more complicated than that because we've also got to keep track of the energy that was used by the previous equipment, the new energy, the loads on the wire, all of that sort of stuff. It covers a huge area, approximately 460 square miles.

The replacement plan is an opportunity for us to go through and update our geographical information system so that it's accurate. It's always been a pretty good system but now it's an excellent opportunity to double-check and correct any errors that are there. The Bureau of Street Lighting is constantly adding equipment through private development; even pole knockdowns have an impact, so it's a good opportunity for us to update all of our information.

What is this project all about?

JIM: The project is actually two phases. The first, which is basically complete now, was to replace 140,000 existing modern cobra-head-type luminaires with the appropriately sized LED fixture. The standard cobra head fixtures look a little bit like a cobra. At the time they were installed, they were a good, efficient, effective way of lighting the streets, as opposed to some other fixtures, which were much more decorative.

That was high-pressure sodium.

JIM: Right. That was the majority, but there was also quite a bit of mercury vapor out there and some other strange stuff from way back.

It was good technology when it came out.

JIM: Exactly. It was very, very efficient compared to incandescent bulbs and stuff like that, but the technology is 60 years old or so and so it's high time it was replaced.

Technology is advancing at a very rapid rate and street lighting reflects that.

JIM: That is so true.

Phase Two

So that's Phase One. You've moving into Phase Two.

JIM: For all intents and purposes we did what we were instructed by Mayor Antonio Villaraigosa to do, which was complete Phase One by June 2013, which we did. We've been doing some work that's over and above the initial 140,000 streetlights, and cleaning up some of the things that weren't done. We've exceeded our 140,000 by a reasonable margin.

The second phase is more complicated and includes some of the project's most important work.

You're focusing on the more decorative fixtures now.

JIM: Yes. It's going to be a lot more labor intensive because there are so many different styles of equipment out there. A lot of it is very beautiful, and some of it is quite old, so we have to be super careful to replace the bulbs so that not only are we improving the efficiency of these lighting fixtures but we're maintaining the historic value of them as well. It's going to be interesting; it's going to be a challenge. I'm really excited about it because there are some great ways of retrofitting existing equipment, but this is real new – just within the last few months. It's going to be a great opportunity.

In the evaluation lab here we saw the fixture that you're working on to go into Chinatown.

JIM: Yes, exactly.

Is there any way to quantify how many types of decorative fixtures are out there?

JIM: I think about 400 special types. There's a huge variation, some dating back to the 1920s.

Your job has gone from sort of a macro to a micro.

JIM: That's an accurate way to look at it. The Bureau of Street Lighting is responsible for somewhere around 215,000 streetlights, and eventually all of these are going to have to be dealt with one way or another. We've taken a good first swipe at it with 140,000 during Phase One, and the rest during Phase Two.

So you're maybe 60, 65 percent finished, something like that.

JIM: That would be fair to say. In terms of the amount of labor and effort, though, the remaining 35 to 40 percent is going to be much more intensive.

History and Efficiency

Can you give me the history of this?

JIM: Sure. Going back to as early as about 2006, our Director, Ed Ebrahimian, began investigating the LED technology for street lighting. At that time the industry was really in its infancy but he saw the potential, and he put together a proof of concept pilot program installing LEDs in various locations throughout the City, about 200 units in total. The evidence that this small pilot provided gave enough confidence for Ed and Assistant Director Norma Isahakian to invest in the technology. Even though it was still early and it wasn't exactly what you'd call great – it was nowhere near as good as it is now – it gave them enough confidence to actually put together a five-year program. Ultimately the five-year program was cut to a four-year program by Mayor Villaraigosa, who wanted to have the entire thing completed before he left office. That gave my team some real challenges because we increased our production by 50 percent. But we managed to meet that goal, so Mayor Villaraigosa went away happy. We were all happy.

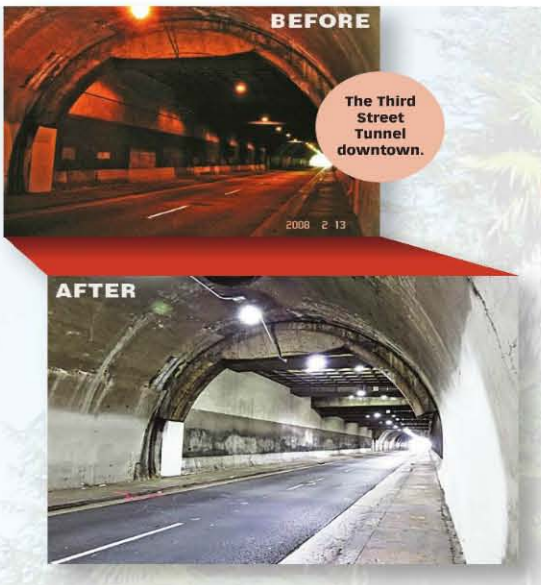
Has anything this big been attempted in such a compact amount of time here in Street Lighting?

JIM: At the time we completed Phase One in June 2013 our project was the biggest in the world by quite a reasonable margin, but at some stage someone is going to have a project that's bigger than us. The equipment continues to improve at a pretty dramatic incline, and in a lot of ways some of the people coming later are going to benefit from our effort, and I think that's good.

It's drawn a lot of positive attention to the City of Los Angeles and to our director because he had the foresight to take advantage of this technology.

How has the equipment gotten more efficient, and how have costs come down since you started this project?

JIM: The efficiency is incredible. We started out hoping for about a 40 percent savings in energy, and now we're getting well over 60, and it shows no sign of decreasing; we're getting more lumens per watt. It's spectacular how the efficiency of these units has improved, and costs have come down tremendously, in the neighborhood of 60 percent reduction since we've gotten started. If you're getting an improvement in efficiency of 30 or 40 percent and a reduction in costs of 50 or 60 percent, it's great.



ALIVE! FEATURE

Among LA's Best

Public Works/Street Lighting's LED retrofit program was among many City projects named as the best in the City during the 2011 edition of CAO's annual Quality and Productivity Awards. Here's how *Alive!* covered the project in our December 2011 issue (all figures were accurate at the time).

LED Street Light Energy Efficiency Program

Office of the Mayor

Public Works/ Street Lighting

DWP/Non-Residential Energy Efficiency Programs

The winning team at the Quality and Productivity Awards ceremony in October 2011.

October **2011**

This project exemplifies the benefits of cooperation. The DWP provided the financial backing that included rebates and loans. Public Works/Street Lighting's New Technology Group spearheaded the use of LED for civic projects. And, the Mayor's Office coordinated this five-year plan centered on adopting new technologies and improving efficiency. The City has converted 45,000 streetlights to LED and will replace 140,000 existing streetlight fixtures in the City with LED units. Using LED units to replace current incandescent lamps will generate energy savings of 40 percent, which will translate into annual cost savings of $1.6 million for the next seven years as DWP's loan is repaid.

You're working with manufacturers pretty much every day to develop this technology.

JIM: That's so true. Early on there were many companies just appearing, startup companies bringing equipment made in somebody's garage, and we could tell. A consideration was, who are these manufacturers and are they going to be around by the time their warranty expires? That's one thing we had to take into consideration while we were doing this.

Impacts

Is there any way to describe what your savings are?

JIM: Yes. The results of this retrofit are easily quantifiable, and our team has gone to great lengths to ensure that our data is both accurate and verifiable.

With each replacement we calculate how much energy was being used, how much energy is being used, and a bunch of other data. As of today, we've reduced our energy use by 89 gigawatt hours.

From left: Jim Quigley, Street Lighting Engineer, LED retrofit program manager, Club Member, 21 years of City service; and Robert Larios, the Club's Vice President of Operations.

Over a year?

JIM: Yes, exactly, so that's a savings of 89 gigawatt hours, and that's a big number. That represents an annual savings of approximately $8 million at the cost of energy now. Energy costs are going to continue to go up. It's critical for our Bureau to look for ways of reducing costs, and of course this program is an excellent example.

About other impacts: If you look at some of the before and after pictures, you can see an enormous improvement in the color rendition and the brightness. Recognizing faces and colors is much easier under this new whiter light, and even something like curb address – painted addresses on the curb, which are virtually invisible underneath the old high-pressure sodium color light – stand out quite clearly with the LED light. Even police helicopter pilots are saying how much easier it is to see a particular color of a car as they are doing a police chase. Those are some of the advantages not as easily quantified as the money or the metric tons of carbon dioxide that are being saved, but it's definitely a quality product improvement.

We did get some data from the LAPD. We've had very positive feedback from them, by the way, and the nighttime crime has gone down. How much of that is an impact of our program I'm not sure, but I think we should take some credit for it because it's reduced substantially.

Everyone feels safer in a brighter neighborhood.

JIM: I think you're right.

Have you heard anything from Hollywood studios or studio lighting people saying that they like shooting better because the light's better?

JIM: Well, one of the really interesting things: We converted the Sixth Street Bridge back in 2009 or 2010, and almost immediately these car commercials started appearing because the light was different. It gives this super-clear rendition of their cars at night. But if they're trying to do a period piece it's going to be somewhat problematic because it looks different and bright.

Another interesting thing is that incandescents put out a lot of heat, but LEDs don't, right?

JIM: Yes, the older technology created a lot of heat, and a lot of dirt and grime got baked onto the lens side of those things. You have to assume that your light is going to depreciate a certain amount because of dirt. But we're finding with the LEDs that there isn't really any dirt depreciation, there isn't soot and smog and dust getting baked on at night. These LEDs are staying a lot cleaner, and that's really good.

Accolades

Talk about being a national leader and the kind of attention that you're getting.

JIM: The program has garnered a lot of attention both nationally and internationally. We get a couple of calls a week from various groups that are wanting to get information on best practices, how did we do it, what worked, what didn't work, what units did we use, and so forth. These latecomers are going to benefit greatly from the things that we've learned and the improvement of the equipment.

Ed Ebrahimian is internationally known for this program. He talks to people and gives them ideas about how to make it work.

It puts L.A. in a great light, so to speak.

JIM: I think it does. The attention that it's drawn to our City has been positive. The Clinton Climate Initiative was one of the sponsors of our program way back in 2009, and the DWP contributed loans to this program.

Household Advice

What advice would you give to residential people about switching from incandescent bulbs? What do you recommend? What should people do?

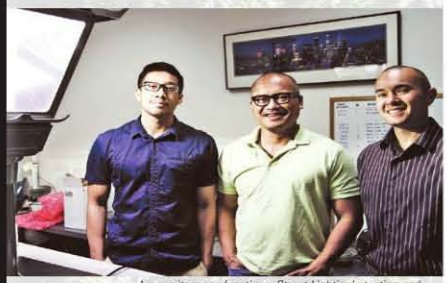
JIM: That's an interesting question. I have to admit it was just a couple of weeks ago that I purchased my first LED bulb for home because they've been expensive, and quite frankly I was a little put off by the whole CFL twisty-tube bulbs …

… the swirly ice cream-shaped bulbs …

JIM: … right. I wasn't happy with them, so I was a little bit hesitant. But now if you go to Home Depot or Costco, these new LED bulbs are appearing. I bought my first ones just recently, and I think they were ten bucks apiece. That seems like a lot for a bulb, but they work. One of the really important things to remember with this kind of purchase is to compare the actual lumen output of them. Do an actual lumen-output comparison, not just a marketing claim, so you know what you're getting. Find one that gives you the same amount. Look at the lumen output and the color of the light.

One thing we can certainly expect is that these things are going to continue to go down in price particularly at the residential level because it's pretty new. The price of these things is going to continue to go down, the lumen output is going to continue to increase, and I think it's really promising. I don't think it's too early now, but last year it was too early to buy them.

Great. Thanks for the advice, and thanks for the interview.



Among its many functions, Street Lighting's testing and evaluation team brings fixtures into its lab and tests what bulbs would be optimal in them. Here, as part of the LED retrofit project's Phase Two, the team is testing LED bulbs in a decorative fixture used in Chinatown. The team is, from left: Jeffrey Tangonan, Street Lighting Engineering Associate II, 3 years of City service; Michael Fabregas, Street Lighting Engineering Associate II, 7 years; and Clinton Tsurui, Street Lighting Engineering Associate III, 10 years.

Street Lighting's implementation team uses a geographical information system to formulate replacement plans – complex maps and graphs that determine where the new bulbs will go, when they will be retrofitted, how much power the new installations will require, how much power they will save, how to get that power to the light standards, updating the bureau's databases, and so forth. The team is, from left: Richard Sarigumba, Street Light Engineering Associate III, 21 years of City service; Nick Tran, Street Light Engineering Associate II, 13 years; Shabnam Shahriari, Street Light Engineering Associate II, 6 years; Mark Libuit, Street Light Engineering Associate II, 7 years; and Steven Jew, Civil Engineering Associate II, 8 years.

LED LIGHTING