lights.lacity.gov

Bureau of Street Lighting

LA Lights Strategic Plan 2020-2025

Provide reliable, safe lighting for all residents and visitors, lighting the way for Angelenos.

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Mayor's Message

Dear Angelenos,

Every day, the staff at the Bureau of Street Lighting keep our streets safe and illuminated. By managing and operating the system that brightens our historic boulevards, our local landmarks, and our neighborhoods, this team helps our city shine — literally — and sustain its place as an iconic destination of breathtaking beauty and dynamic design the world over.

BSL is much more than just a department that oversees a series of over 200,000 streetlights — it's a public agency that's redefining how innovation and smart design can make our city a more sustainable place to live. Today, the modern streetlight in Los Angeles is emblematic of this approach: a vessel for 5G cell towers; a hub for electric vehicle charging stations; a carrier for smart sensors to track air quality and monitor pedestrian safety. And with the conclusion of the L.A. Lights the Way Streetlight design competition, streetlights will also become a future cornerstone of the infrastructure that brings much-needed shade to our hottest, most vulnerable communities and an opportunity to share our diverse culture across our city with cultural placards.

When we invest in smarter design in our streetlights and infrastructure, we make our public spaces into proving grounds for a future that's cleaner, greener, and more secure for all Angelenos. I am proud of all that BSL has done to advance and reflect the very best of the Angeleno spirit, and I look forward to our shared work to light the way toward a more prosperous and equitable future for all of our city's residents.

Sincerely,

Mayor Eric Garetti

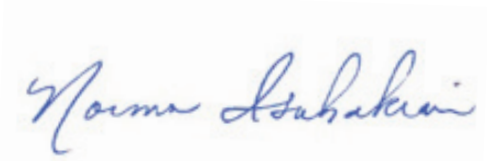
Bureau Director's Message

In 2014, the artist Chris Burden, in describing his installation "Urban Light," which consists of 202 cast-iron streetlights arranged along Wilshire Boulevard marking the entrance to the Los Angeles County Museum of Art, said something that has stuck with me as Executive Director of the Bureau of Street Lighting. The design of streetlights, he noted, reveals something important "about what constitutes a civilized and sophisticated city, safe after dark and beautiful to behold." This statement embodies the Bureau of Street Lighting's mission; repair streetlights that are not working, construct new systems to brighten communities at night, use our streetlights to express a community's personality, and ensure that the City of LA's streetlights live up to the historic beauty of their iconic designs.

The City of Los Angeles has been transforming the way cities provide street lighting for nearly 100 years since gas in 1882, electric in the 1900s, LEDs in 2008, and smart lights in 2010. Los Angeles has always been a destination for dreams, innovation, and trend setting ideas. In that same spirit, the city's infrastructure of Silent Giants (streetlights) has evolved into more than a light source. This document provides a roadmap as the City uses streetlights to be a part of an intelligent city ecosystem. This ecosystem will provide the backbone for communication systems, and smart city solutions, that play a critical role in the efficiency, equity, and benefits to our residents. The plan also illuminates the way the City's system of 223,000 streetlights intersects with many of the City's values and priorities including: Safety, Smart City, Equity, Sustainability/Resiliency, and Community Identity and Service. These themes are woven throughout.

This year the City of Los Angeles is also sponsoring some exciting events centered on the City's street lighting system including a **LA Streetlight Design Contest**, and a **Smart City Streetlight Virtual Conference** both scheduled in August 2020.

I am very proud of the Bureau of Street Lighting, and all the men and women that work tirelessly to deliver streetlight service for the four million residents and over 50 million visitors of this City. This Strategic Plan is dedicated to them and all that came before them.



Norma Isahakian, Executive Director
Bureau of Street Lighting, City of LA

City of Los Angeles Board of Public Works

On behalf of the Board of Public Works, I am honored to share the recent accomplishments and future goals of the Bureau of Street Lighting. With the responsibility of illuminating our streets and ensuring the safety of pedestrians and motorists, Street Lighting provides essential services that greatly impact residents and visitors of the City of Los Angeles.

As the representative for the Bureau of Street Lighting, I have always been immensely proud of the hard work, vision, and dedication of our employees. Thanks to their tireless efforts the Bureau is able to deliver core City services that make our neighborhoods work, whether it's repairing a broken light, designing locations for new streetlights, or installing electric vehicle chargers.

This Strategic Plan is a guiding light for the City to expand upon the critical role that streetlights play in public safety and include opportunities that enhance livability for all Angelenos and visitors alike. Throughout this Plan you will see these new methods that include Smart City elements, communication systems, EV charging stations, air quality meters and other interactive elements that are becoming part of the street lighting system.

The Plan also showcases the Bureau's commitment to public engagement which includes efforts to develop a process for feedback from community members, City Council Offices and Neighborhood Councils. We all rely on streetlights not just to light our nights, but also to provide a unique means of identification for every neighborhood. It's more important than ever to design streetscapes that are representative of the diverse communities, each with their own geographic and cultural identity, that make up our great City.

I encourage all of you to stay updated by visiting the Street Lighting website and follow along on social media @LALight to share your thoughts and contribute your ideas as we continue to move forward together.

Aura Garcia,
Board of Public Works, Vice President

Coronavirus (COVID-19) Impact Statement

The LA Lights Smart City Strategic Plan grew from months of research and collaboration within the Bureau, city partners, and residents. The global health pandemic changed everything. As a Bureau of the Department of Public Works, Street Lighting is an essential city service. Our core responsibility, to keep the streetlights on across 470 square miles, has taken on a whole new meaning. The Bureau's daily operations and service delivery models changed overnight. Thus, challenging us to be at our best and to respond with new considerations and compassion for our most vulnerable residents. The pandemic reminds us of how city services have special gravity under shelter-in-place. It magnifies the importance of connectivity and access to technology. It highlights the social and economic disparities within city borders and in our neighborhoods. This event requires a reframing of smart city solutions, as mechanisms for solving infrastructure and social challenges.

Our priorities remain the health and safety of our employees and residents. In the coming months, we will evaluate our immediate response to the pandemic to identify issues and best practices. Building on these strengths, we can make Los Angeles more connected, responsive, and resilient in the face of this pandemic.

Introduction

Los Angeles is home to four million residents from diverse backgrounds. As a global destination with over 50 million annual visitors, Los Angeles will be the first 5G city in the nation. The City has deployed rapid mobility transit and connected solutions and increasingly depends on Smart Technology to manage the synergy of everyday life. Los Angeles has the third largest pool of tech workers on the West Coast, and as the technology industry grows, companies such as System 1 and Google locate in a hub in our own "Silicon Beach". Los Angeles has always been a destination for dreams, innovation, and trend setting ideas. In that same spirit, Smart City, connected infrastructure and technology, is imperative for progress and the future of great cities. As part of an intelligent city ecosystem, the Bureau of Street Lighting plays a critical role, and together with other City departments, creates a cohesive and adaptable Smart City System.

The City of Los Angeles has been transforming the way cities provide street lighting for nearly a century since gas in 1882, electric in the 1900s, LEDs in 2008, and "smart lights" in 2010. The streetlight EV Charging Station in 2015 and the integration of software as a service (SaaS) solutions have established Los Angeles as a leader in the Smart City landscape. In 2021, the City of Los Angeles will feature 100% LED streetlights. This remarkable achievement will mean that Los Angeles is the undisputed world leader in street lighting. We receive requests from municipalities around the globe regarding our award-winning LA Lights.

The Bureau of Street Lighting continues to explore and test new technologies that transform the often-unnoticed streetlight equipped with a future high-tech virus tracking sensor that may one day save lives.

Purpose

The Bureau of Street Lighting is the most advanced Street Lighting Network in the world, and we continue to develop better and more advanced public services and connected solutions for businesses, residents and visitors. Our ongoing commitment to seek out and implement new technology, provides services that improve the conditions and maximize the future potential for all of residents and visitors. This plan highlights current projects and the objectives and actions to expand our smart city capabilities, strengthen our digital infrastructure and facilitate community-driven solutions for a better-connected Los Angeles now and in the future. It concludes with a 5 year-roadmap for achieving the forthcoming Street Lighting Network.

Commitment to Sustainability: UN Sustainable Development Goals (UN SDGs)

In 2017, Mayor Eric Garcetti committed to adopting and enacting the United Nations Sustainable Development Goals (UN SDGs)[1] at the local level. Under this commitment, Los Angeles is aligning all of the City's activities with the SDGs. In order to be consistent with the LA's Green New Deal, Sustainable City pLAn, the LA Lights Strategic Plan aligns with these goals as well.

Throughout the Plan, each section that works towards fulfilling an SDG will be marked with an icon (1), with the number indicating which UN Goal it correlates with. The goals can be identified by referencing the appendix. Summary of UN SDGs below.

(5) **= UN Sustainable Development Goal #5 is being met.**

[1] *Untied Nation Sustainable Development Goals available: un.org/sustainabledevelopment*

Street Lighting Vision, Mission, and Values

Vision

LA Lights Network of streetlights is a world leader promoting sustainability and walkability for Los Angeles.

Mission

Provide reliable, safe lighting for all residents and visitors, lighting the way for Angelenos.

Values

- **Community:** Commit to the safety and security of our residents including fostering and supporting community connections.
- **Accessibility:** Provide services and programs that are easily accessible, inclusive and responsive to our residents' needs.
- **Equity:** Dedicate to equitable service outcomes for our employees and residents.
- **Sustainability:** Utilize efficient climate-friendly products and materials across agency operations and remain consistent with L.A.'s Green New Deal Plan 2019.

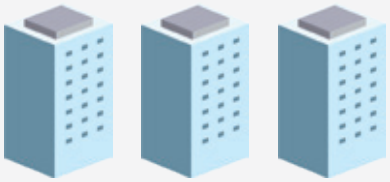
The Bureau of Street Lighting

The Bureau of Street Lighting designs, constructs, and maintains approximately 223,000 streetlights across the City of Los Angeles. The System has over 400 different styles ranging from modern to ornate/historic and illuminates two-thirds of the City. Street Lighting systems have several purposes as part of the City's infrastructure:

- Provide public safety
- Enhance and assist transportation
- Enhance community identity
- Add aesthetic value to the City's historic fabric
- A platform for City's Smart Solutions (Smart Infrastructure)

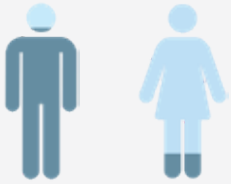
The Bureau mission began in 1925 as the Bureau of Power and Lights, within the Department of Public Works. Throughout the years, lighting initiatives have expanded and evolved. Currently, the Bureau's maintenance division responds to over 45,000 light outages each year, manages an expanding network of smart streetlights, and service solutions beyond the broadcast of light. The Bureau of Street Lighting is 100% special funded. Street Lighting maintenance is financed primarily by the Street Lighting Maintenance Assessment Fund which generates $42 million annually. This fund covers all costs associated with the operation and maintenance of the City's street lighting system.

LA Lights Profile



3 Offices:
Downtown L.A., Hollywood, & San Fernando Valley

379
Employees



86% Men **14%** Women

38 Years (December 1982)
Long Tenure Employee

5 months (March 2020)
Shortest Tenure

Service Profile:

City's **469** square miles

7500 Miles of Street

223K Street Lights

45,000+ Annual Street Lighting Repairs (2019-20)

550K Street Lighting District Assessments Parcels

LA Lights Profile

1990 BSL

2020 LA Lights

The Bureau's strategic planning process includes an inclusive re-branding process which considered the mission, vision, values and look of the agency. The outcomes were selected by voting from all Bureau staff.

Los Angeles History of Streetlights

The first era of street lighting began in the 1860s when Los Angeles had fewer than 10,000 residents, concentrated near the Los Angeles Plaza Historic District, the L.A. River, and what is now downtown. In 1867 the Los Angeles Gas Company, a private concern operating under a franchise given by the City and a precursor of today's Southern California Gas Company, installed gas street lamps around the historic plaza and major thoroughfares, adding over 130 to the cityscape by 1873. These lamps were lit nightly by a traveling lamplighter. The gas was first made from asphalt and later with oil.

In the 1880s, the introduction of direct-current electric arc lighting changed the trajectory of streetlight design -lifting streetlights. So-called Brush lamps using this technology produced such an intensely bright light that their masts rose as high as 150 feet, so as not to blind pedestrians. These lights, referred to as "moonlight towers," had three lamps, illuminating similarly to a full moon.

In 1905 the City installed over 130 electroliers along Broadway, financed by the Broadway Boulevard Association. This became the norm, private developers or merchants paying the City to install lights to bring illumination and sophistication, creating foot traffic and business. This was also the beginning of high-design streetlights. Hill, Spring, and Main streets soon installed similar lighting and created a nighttime effect that drew wide notice.

A decade later, Mazda C, a gas-filled lamp, emerged as an upgrade over the incandescent bulbs. Providing stronger, more reliable light, the Mazda C helped propel a new version of the electrolier featuring dual upright lamps. It wasn't until 1911 when the Board of Municipal Art Commissioners was established that Los Angeles began an approval process for new streetlight designs. In 1916, the City became responsible for delivering municipal power to streetlights. Later that year, the City installed streetlights for the first time, lighting Sycamore Park in northeast Los Angeles.

The Bureau of Street Lighting was established in 1925. Its primary task was to provide power and maintenance to streetlights chosen (and funded) by developers from City-approved designs. Los Angeles also began installing basic, utilitarian streetlights (a lamp attached to a timber pole) subsidized by the City's General Fund.

As Los Angeles quickly grew in the late 1920s, streetlight designs became central to efforts by commercial districts along Wilshire Boulevard and in Westwood Village to distinguish themselves from other sections of Los Angeles. Often, they included wire carrying attachments for the region's expansive streetcar network.

In 1936, the Hoover Dam's energy allowed the City to illuminate more territory. That same decade, two significant changes led to the post-World War II designs to come. The first saw upright forms give way to pendants -- with teardrop-shaped lamps -- attached to horizontal arms extending from the pole. The second change was in the technology, with High-Intensity Discharge (HID)

lamps that ignited a gas (mercury vapor). The years following World War II brought the third era of streetlight design, based on advances in HID technology. Some new designs came from Mid-Century Modernism of the region's latest residential architecture, while others were more efficient versions of existing designs.

The most significant milestones came in 2009, when the Bureau of Street Lighting began installing LED (Light Emitting Diode) lamps. Smaller, lighter, and more efficient, LEDs represented a leap forward in lighting technology as great as any in the history of streetlight design in Los Angeles.

Street Lighting Divisions

The Bureau consists of 14 divisions responsible for the City's Street Lighting System and the delivery of programs and services.

Street Lighting Divisions

1. Administration Services
2. DOT Lighting Design
3. Co-Location
4. Community Engagement
5. Community Services
6. Field Operations: Maintenance and Construction
7. Grants Division
8. High Voltage Projects
9. Infrastructure Improvement & Special Projects
10. Information Technology
11. Technology Research & Development
12. Private Development & Bond Finance
13. Street Lighting Assessment
14. Transit Lighting

Bureau of Street Lighting Annual Budget

The annual program budget supports the four core functions of the Bureau of Street Lighting.

I. **Design & Construction $17.9M** Funds the design and construction for new lighting, replacing older lighting, and supports lighting designs for other agencies and departments to meet nationally accepted standards.

II. **System Operations, Maintenance, and Restoration $12.2M** Safeguard operations, maintenance, and repair of the infrastructure and responds to physical failures, damages, and vandalism incidents.

III. **Street Lighting Assessment $1M** Supports coordination for all street lighting assessment activities for over 500K parcels.

IV. **General Administration & Support $2.9M** Provides all Bureau administrative support, such as budget, personnel, finance, and accounting services.

Bureau of Street Lighting Administration

The Administration Division provides executive, technical, and administrative support for the Bureau of Street Lighting. The team is responsible for budget preparation, finance, accounting duties, and coordinates all personnel administration support.

Street Lighting Assessment Division

The Bureau of Street Lighting is 100% special funded. Street Lighting is financed primarily from the Street Lighting Maintenance Assessment Fund (Street Lighting Assessment Districts), which generates $42 million annually. This fund covers all costs associated with the operation and maintenance of the City's street lighting system, energy cost, material, labor, and fleet. The Bureau's assessments fund is collected through property taxes and may only be used for the operation and maintenance of the City's street lighting system. It is illegal to use this fund to install new streetlights. If property owners/neighborhood want to install streetlights, they will need to provide a petition to the City to show a majority community support and be in compliance with Proposition 218.[2] The City's Street Lighting Assessment Districts consist of over 550,000 parcels that require processing and updating annually. **The Bureau is developing an Assessment Digitalization Strategy to enhance our data-base to include all assessment properties (550k), calculation values and digital assessment maps.**

New Street Lighting

Until the mid-1950s, the City did not require developers of housing, commercial, and industrial property to install street lighting. So, in the older areas of the City, most streets did not have streetlights unless the developer voluntarily installed them, or a neighborhood group or their Council Office started a project to install them at the property owners' expense.

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[2] Proposition 218: In November 1996, California voters passed Proposition 218, the "Right to Vote on Taxes Act." Proposition 218 requires voter approval before imposition or increase of general taxes, assessments, and specific user fees.

Only those who have street lighting pay for it. Through the purchase of a property which has existing street lighting, or through an assessment for a street lighting project, property owners pay for the installation of street lighting in Los Angeles. Maintenance costs are assessed annually. Annual assessments are not paid for from the basic property taxes or other taxes. All projects that install new lights or upgrade existing systems require a vote of the property owners in compliance with Proposition 218, now part of the California Constitution.

Street Lighting Operations and Maintenance

The Bureau's Field Operations Division is responsible for the operation, maintenance, and repair of the City's Street Lighting System of 223K streetlights. Our field crews respond to over 45,000 repairs annually, which may include physical failures, damages, and vandalism. In addition to repairs, they provide installations and essential construction programs supported by a fleet of 130 vehicles. All infrastructure projects are managed through a comprehensive Asset Management System (AMS). The system integrates a GIS mapping system that shows all the streetlights in the City with their associated circuitry, pole type, history of installation to maintenance, and any other items attached to the pole. This System is used in coordination with the City's 311 system (including MyLA 311 App) to report streetlight outages which are forwarded directly to our field operations for crew assignment.

The maintenance volume paired with expansion of smart city products have put strain on the aging Management System. The Bureau will undertake a System modernization to improve operational efficiencies including maintenance and infrastructure projects. **The division will focus on three improvements areas: Infrastructure, system management and workforce development in the next five years.**

Objectives:

- Identify a new location to expand from current 5-acre property to store materials and fleet.
- Develop infrastructure replacement programs including replacement of an aging fleet, 10-year light pole painting plan, and a 75-year Restoration Plan for approximately 188,000 streetlight poles.
- Improve Platform interoperability to improve workflow management tools (live data tracking).
- Implement Online Materials Management Procurement System (Supply change management).
- Develop workforce development staff resources, training and technology tools.

Field Operations Facts

99% Streetlights Currently Functioning

45k Repairs Annually (2019-20)

Weekly Repairs **700**

Fleet **130**

Field Crew **220**

Street Lighting Repairs

- Single Light Out
- Vandalism
- Copper Wire Theft
- Electrical Failure
- Glare Shield
- Post Hit
- Conduit Hit
- Banner Damage
- Natural Disaster

1 Street Lighting System

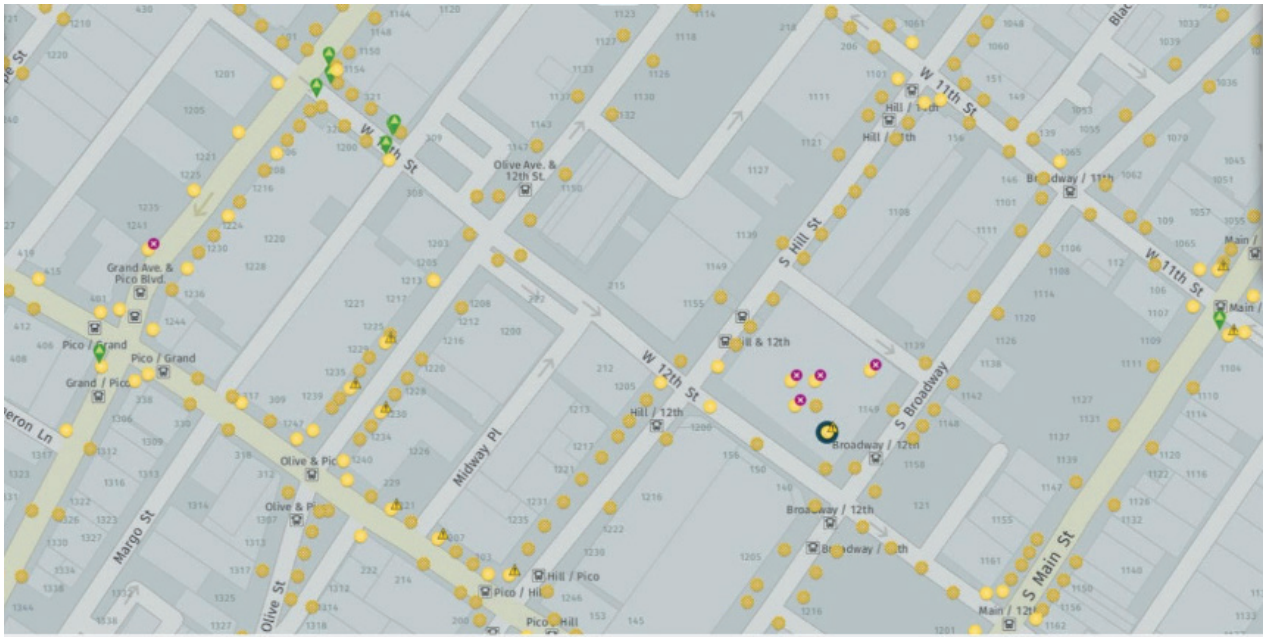
The City's Street Lighting System is LED light technology, which is internet capable and extremely energy efficient. In 2010, we transformed our system utilizing Remote Monitoring Units (RMU) or Smart Nodes, which connect directly to the top of streetlights and transmit data via (LTE-M) cellular-based IoT networks similar to cell phones. Smart Nodes enable the ability to control the light remotely, to schedule on/off, customized lighting and dim "lighting" levels, and report energy usage. These Smart nodes are part of an advanced, interconnected network to provide real-time status and notify of outages and failure indicators. The Smart Node system reduces maintenance costs, conserves energy, and boosts overall operational efficiencies. Currently, there are 37K smart [nodes] lights operational of the City's 223K streetlights. In the next five years, Street Lighting plans to deploy 7000 additional Smart Nodes to expand our street lighting network and system efficiency. The Bureau will continue network expansion to achieve a fully connected streetlight system of the future.

Street Lighting System Management: Information Technology

The Bureau's Information Technology Division Delivers Mission Critical Support

The City's Street Lighting System is managed across various system platforms, including the Bureau's internal Asset Management System (AMS), Geographic Information System (GIS) Mapping, CityTouch, and the integrated City's 311 system. These multiple platforms, including network security, are managed by the Bureau's Information Technology Division (ITD).

City Touch: Network "Connected" LA Lights



Key: *Bright Yellow: Active*
Green: *Pending Connection*
Dull Yellow: *No node*
Magenta: *Error (light out)*
Yellow Triangle: *Warning (no communication)*

LA Network Lights: Real-time Status Stats

REALTIME PROPERTIES
Outdoor Luminaire Controller (OLC)

From 5/27/2020 12:20 PM

General	
Requested Dimming Value	0.0 %
Actual Dimming Value	0.0 %
Energy Counter Value	1,754,252.70 Wh
Burning Hours	19,111 H
Voltage	121.4 V
Current	20 mA
Power	1.27 W
Line Frequency	60.0 Hz
Power Factor	51 %
Lux Level	400 lx
Temperature	41 °
Longitude	-118.215580 °
Latitude	34.034245 °
Photo Cell On Level	35 lx
Photo Cell Off Level	18 lx
Clo Enabled	No
Min Dimming Level	10.0 %
Local Time	05/27/2020 12:20:44
Firmware Version	"STM32 AP: 1.0.22757":"STM8 AP: 0.0.11
Next Sunrise Time	5/28/2020 5:43:00 AM

The division maintains all critical Street Lighting data, including a complete GIS mapping system that shows every streetlight in the City with its associated circuitry, pole type, lamp type, history of installation to maintenance, and any other items attached to the pole. In addition to systems and data platform management, ITD provides all digital and technical support for Bureau operations, including computers, laptops, printers, and local and remote networking. The division has quickly expanded and grown to support the Bureau's new Smart City programs. Street Lighting's ITD will lead the Digital Transformation Journey the Bureau undertakes over the next five years, discussed in the Smart City Road Map later in this document.

Street Lighting Design and Construction

In addition to street lighting, the Bureau works with numerous City departments, LA County, and California state agencies on critical transportation and special projects. Street Lighting delivers a wide variety of projects such as roadway lighting, bus stop security lighting, pedestrian lighting, and bridge and tunnel lighting. These projects are funded from various sources and are coordinated with affected Community and Council Offices. Over the last couple of years, the Bureau has implemented several productivity improvements such as streamlining the design and approval process, reorganizing to facilitate building with in-house crews, and hiring temporary help to meet the demands of construction.

Current Projects

Los Angeles World Airports (LAWA) Land Access Modernization Program (LAMP)

The LAMP project will result in the modernization of LAX, the City's airport, to accommodate the current and anticipated growth in traffic of air travelers. These improvements will significantly improve the traveler's experience, reduce area gridlock, reduce pedestrian activity at the street level and thus reduce liability. The Bureau of Street Lighting is providing preliminary engineering support and assigning dedicated staff to achieve the accelerated timeline.

Transportation Grant Annual Work Program

The Transportation Grant Annual Work Program utilizes outside funding to facilitate the betterment of transportation in the City of Los Angeles. These projects include Bikeway Improvements, Bus Stop Improvements, Streetscape Projects, Pedestrian Improvement Projects, and Regional Surface Transportation Improvements. These projects are initiated by the Department of Transportation and typically include street lighting improvements. The Bureau provides design and construction services for these projects.

Metro/Expo Authority Transit Work Program

The Bureau provides design and plan review services to support the projects associated with Metro/Expo. All of these projects are required to meet illumination levels per national standards to provide adequate lighting levels for vehicular and pedestrian movements around rail projects.

Vision Zero

The Bureau leads the street lighting design portion for the City's ATSAC/ATCS[3] and New Signal/Signal Modification program as the Department of Transportations (DOT) improves the signal system. The Bureau evaluates each intersection and provides design services to ensure that the intersections meet the required lighting levels per national standards. The Bureau's goal is to provide timely design support and construction services.

Mayor Eric Garcetti's Executive Directive No.10 directs all departments to prioritize infrastructure improvements and identify additional needs of the Vision Zero - High Injury Network (HIN). Vision Zero's primary goal is to eliminate traffic-related deaths by 2025. Street Lighting plays an essential role in the public safety of vehicles and pedestrian traffic. The Bureau's role in Vision Zero is to provide adequate illumination at mid-block crosswalks, ensure that all streetlights are smart [network] lights to report outages automatically, and to install motion sensors at midblock crosswalks to increase visibility for pedestrians, cyclists, and motorists.

[3] *Automated Traffic Surveillance and Control (ATSAC) (https://ladot.lacity.org/); and Adaptive Traffic Control System (ATCS) (**https://cityclerk.lacity.org**)*

A Bridge Home (Homelessness Program)

The Mayor's "A Bridge Home" program seeks to give temporary, dignified shelter to homeless Angelenos waiting to be connected to their permanent living situation. Street Lighting is supporting the program by providing lighting improvements and upgrading the surrounding lighting within program areas to increase safety and livability.[4] The Bureau will be installing security lighting to add or enhance lighting at bus stops throughout the City.

L.A.'s LED Dominance

The Bureau of Street Lighting is on pace to achieve full LED street lighting citywide by the conclusion of 2020-21. Currently, the City's Street Lighting System is 98% LED. As most cities embark on LED conversations, Los Angeles is preparing our LED Upgrade Program to renovate streetlights with the next generation wave of LEDs. Upgrades will further advance our energy conservation efforts and improve system efficiency.

L.A.'s LED Journey: LED Citywide Conversion Program

The Bureau completed the conversion of 140,000 modern/cobra head streetlight fixtures to energy-efficient LED units in 2013. Phase II of the LED Conversion program began in 2014-15, to convert the remaining 20,000 streetlights that are decorative with various designs. Decorative streetlights vary in their composition and are not standard LED designs. This makes it challenging to find suitable LED products and is more labor-intensive for crews. Phase II was completed in 2018-19. The City's LED Lighting System delivers 64% energy savings (114 gigawatt hours saved annually) and reduces carbon emissions by 67,000 metric tons. The program provides approximately $10 million in annual energy savings and reduces the maintenance of the City's street lighting system. The City of Los Angeles has gained national and international acclaim for leading the way with this comprehensive LED light conversion program.

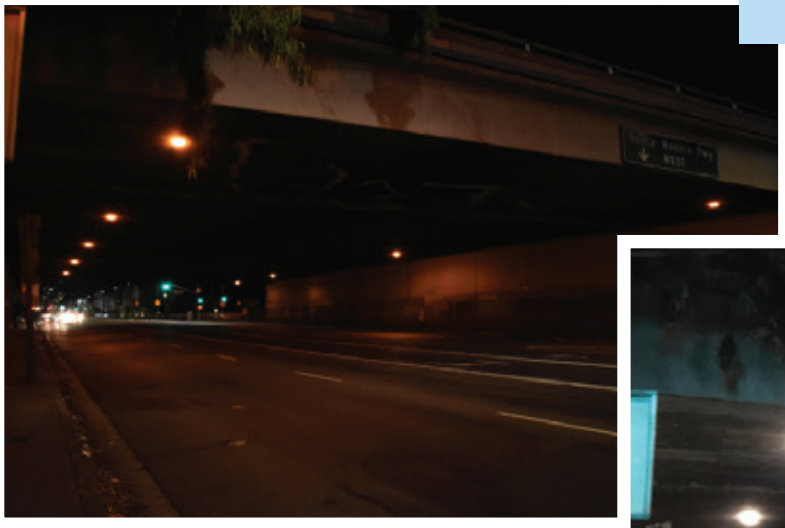
[4] *More information is available at lamayor.org/ABridgeHome*

Conversion of High to Low Voltage Program

Today we have approximately 2,500 remaining series (high voltage ~3000V) streetlights throughout the City. These streetlights are on high voltage underground circuits with highly energy inefficient lamps. These dilapidated underground systems are falling apart, with old rebuilt transformers experiencing continuous grounds that cause entire circuits to go out. These systems require the majority of the Bureau's maintenance efforts as well as provide on-going problems for the Department of Water and Power (DWP) crews to maintain the old transformers. The Bureau is completing the final year of the five-year program, which converts approximately 5,000 high voltage lights per year. **The completion of the program is scheduled for 2020-21**.

3 Tunnels and Underpass LED Lighting Improvement Program (TULLIP)

There are over 400 tunnels and underpasses throughout the City of Los Angeles. These underpasses are located where city streets pass under elevated freeway, roads, railroads, and other infrastructure. There is an urgent need to increase the lighting levels at many locations for day and nighttime safety of pedestrians, cyclists, and motorists. The existing underpass lighting systems include fixtures that operate only at night and are prone to light outages due to an older deteriorating lighting system. The Bureau is working to upgrade the lighting systems to LED fixtures that operate day and night, which will improve safety at these locations. **The Bureau's team will convert an additional 100 tunnels and underpasses by the end of 2020 and thus will have completed over 400 in the last four years.**



Street Lighting Programs and Services

Private Development and Bond Finance Division

Private Development projects typically include a new development or change in the use of a property. The City requires improvement projects to provide illumination to the impacted area, via a B-permit. As part of ePlanLA, the Bureau began providing permit plan review services online via ProjectDox in 2019. This new online application process eliminates paper use and the need for customers to apply in person at multiple city offices. It has increased accuracy and efficiency during the plan review and approval process. Further, it enables customers or departments to determine application status as needed. **The Bureau continues to develop tools to enhance permitting services and the user experience for our customers.**

Objectives:

Expand online support tools to enhance the customer experience including updating FAQ's and develop how-to videos to guide customers through the permitting process.

Attachment to Street Lights

Due to the strategic location of the streetlights in the City and their access to power, the Bureau receives requests to attach various items to our poles, including communication equipment, cameras, banners, and community medallions. Any attachment to a streetlight pole must be approved and permitted by the Bureau of Street Lighting. All accessories must meet legal and physical requirements to ensure safety for vehicular and pedestrian traffic.

9 **Streetlights are keeping us connected!**

Los Angeles - First 5G City in the Nation

Co-Location Division (Small Cell Attachments) 5G

Technology continues to evolve such that access and connectivity to our street lighting poles is in high demand. As the use of smartphones, live-streaming, and other communication devices increases, the demand for, and proliferation of, additional antennas and communication cabinets increases. The City took an innovative approach to reduce the installation of cabinets or additional antenna poles on our sidewalks and decided to combine the needed equipment with existing streetlight poles, hence Co-Location.

The Co-Location Program facilitates this effort through the installation of communication devices/ antennas to be attached to or placed within the City's existing streetlight poles. This work includes the replacement of poles, installing larger, stronger foundations, and, when required, rewiring of circuits. Street Lighting coordinates with telecommunication companies, provides designs, coordinates with City crews, and performs administration duties. There are currently 2670 Co-Location poles Citywide. The Bureau's rigorous engineering and design standards are resulting in more innovative streetlight designs, and sleeker integrated poles. These more advanced, aesthetically pleasing poles will strengthen the City's cellular coverage for constituents, businesses, and visitors. In an effort to keep the community informed on small cell attachments, we developed a brochure detailing the function of 5G and integrated small cells, safety, and benefits, which is currently available on our website.

Co-Location Poles

[5] *A comprehensive brochure on 5G and small cell installment (English & Spanish) can be found at lights.lacity.gov*

Community Banner and Medallion Programs

The City's Street Lighting System serves as an important community element through our streetlight Banner and Medallion Programs, which help preserve community and cultural identity. The banners can depict community events, art, and serve as markers to characterize the identity and culture of the surrounding neighborhood or local non-profits. As a cost and recovery program, all the remaining revenue is distributed equally across the City's 15 council districts for community benefit. There are currently over 31,000 banners throughout the City. The Bureau processed approximately 62,000 banner applications in 2019-20. We are working to develop enhancements to the Streetlight Banner online management system for customers and vendors. **The Bureau will launch the City's first digital banner systems in 2020-21**.

Community Services Division

The Bureau's Community Services Division (CSD) provides critical customer service and community assistance support on all street lighting questions or issues. The group is the Bureau's front-line support for resident requests including lighting requests, light shields, or community banners. The team coordinates closely with the City family, including Council Districts and the City's Neighborhood Councils. Community Services also supports Business Improvement Districts, community organizations, and homeowner associations. The CSD responds to over 16,000 stakeholder inquiries per year, often providing one-on-one assistance by phone, email, or in-person. **The Community Services Division is developing additional resources to improve the customer experience for residents and stakeholders who wish to access programs/services**.

Objectives:

- Implement a Customer Relationship Management (CRM) system to streamline stakeholder requests.
- Website redesign including a fully functional self-service portal for stakeholders.
- Develop an online portal for Council Offices and Neighborhood Councils to track and submit streetlight projects in their neighborhoods.

L.A. Gem: Street Light Museum

The Bureau operates and maintains the Street Light Museum, a unique L.A. experience. The exhibit presents the history of street lighting in Los Angeles featuring early decade street lamps in their original glow and design up close. The Bureau is currently working on a series of renovations to enhance the visitor experience, including adding streetlights, designing a museum guide for visitors, and creating a web e-guide. **We are currently developing virtual tours to increase museum accessibility to visitors, locally and around the world**.

Objectives:

- Design a visitor's guide/e-guide that identifies the museum piece with corresponding history/significance.
- Expand the museum pieces to include historical pictures with context and additional pieces throughout the hallways of the Bureau.

Los Angeles Museum of Street Lights

The Street Lighting Museum is accessible via scheduled monthly tour or by appointment, for additional information please visit the **Bureau of Street Lighting**.

Community Connections

As the Bureau continues to advance street lighting and integrate new technologies, it is of utmost importance that the community remain at the forefront when it comes to preparing for future services and opportunities. The Bureau is revitalizing its community engagement to learn and respond to the service needs of Angelenos.

Community Engagement New Division

In 2019, the Bureau established a new service division, Community Engagement (CE), to focus on building a more collaborative and trusting relationship with communities, businesses, and local organizations. The team will implement an impactful community strategy to engage and help deliver equitable outcomes and services for all stakeholders and will explore opportunities to integrate the people and places into the solutions design and planning process.

Engagement Program Model

The program model below is a holistic approach to engagement that considers consumer behavior principles and data analytics, combined with local understanding of the social and cultural dynamics of the City's 15 Council Districts.

Engagement Program Model

Community Outreach Pilot: Fall 2019

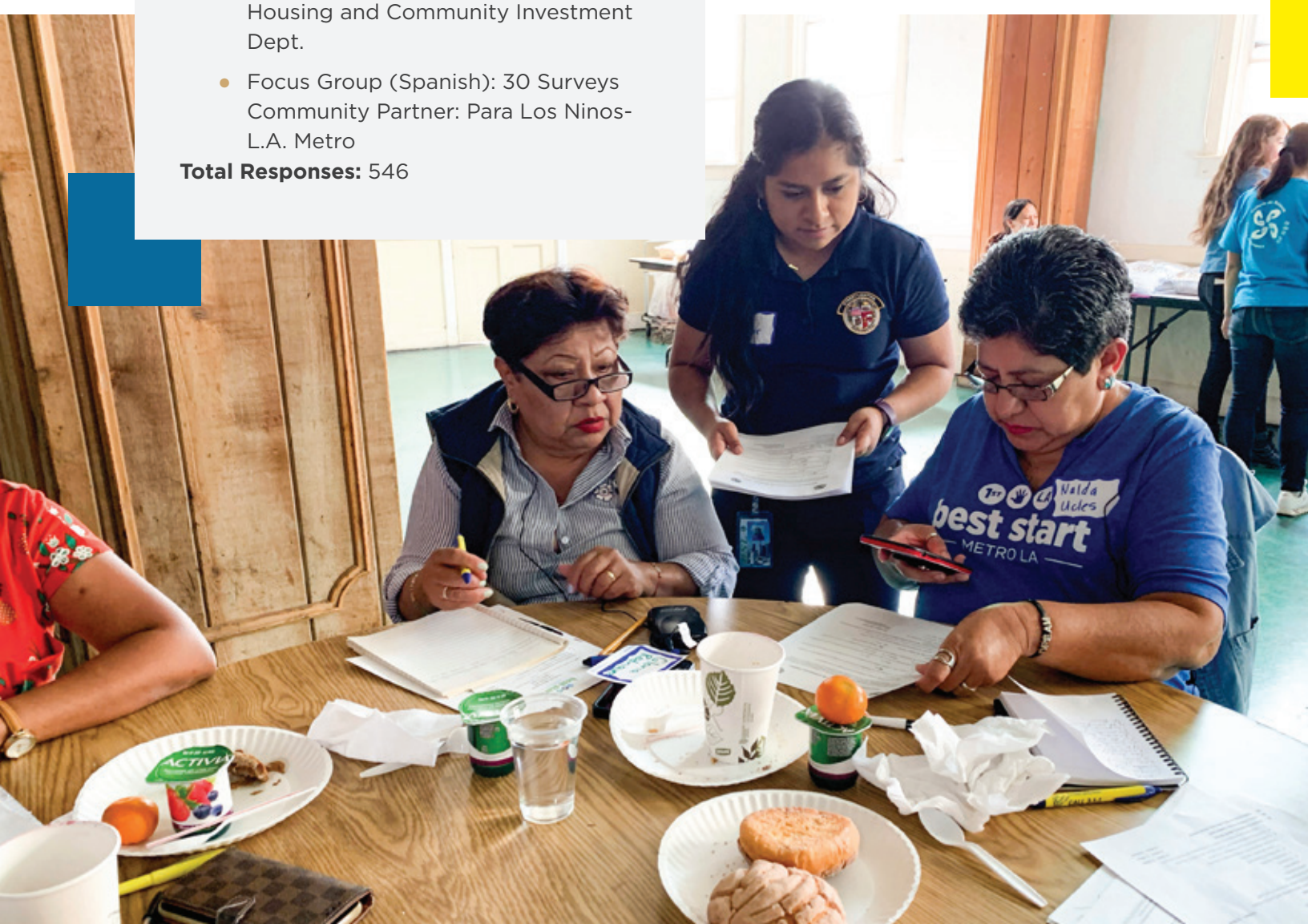
As we consider the technology and program elements for our strategy, we understand the community perspective to be critical to our approach. Our strategy team designed an outreach pilot to assess community priorities and interest in smart city technology. The pilot aimed to connect with diverse communities and residents citywide, including underserved populations, such as those with limited English proficiency, low-income, or non-digitally connected Angelenos who may not know how to access Street Lighting services.

Pilot Design Summary

Timeline: 9/27/19 - 11/26/19
Distribution Channels

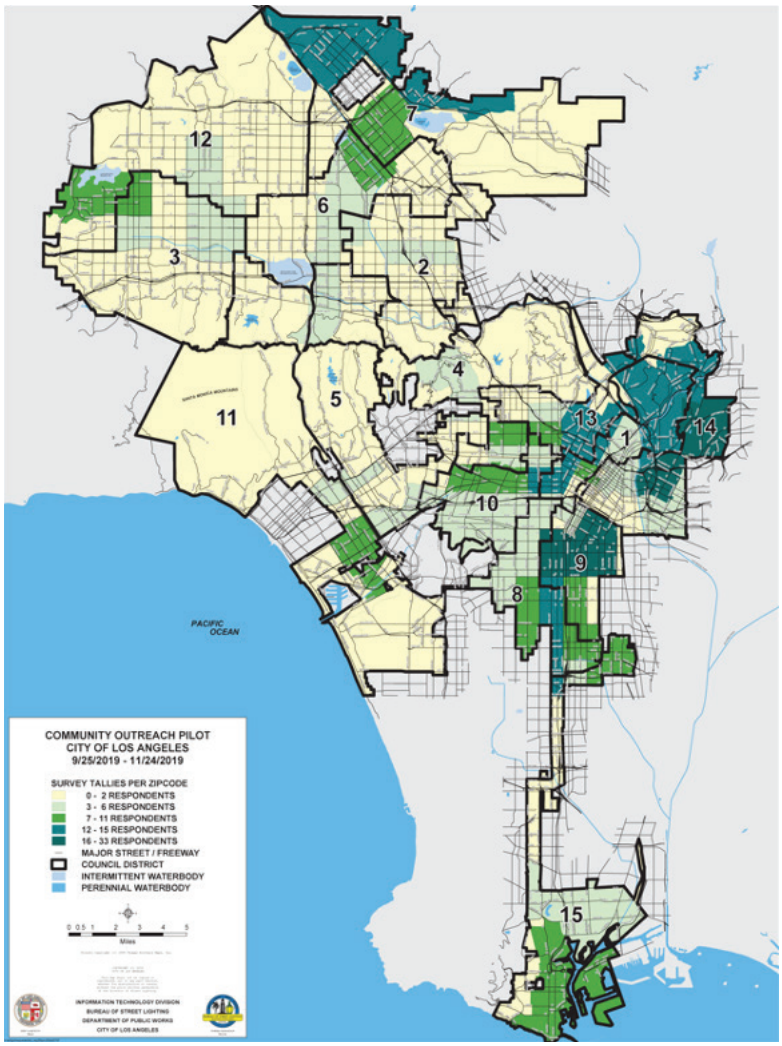
- Community Events: 87 Surveys
- 16 Family Source Centers: 409 Surveys Housing and Community Investment Dept.
- Focus Group (Spanish): 30 Surveys Community Partner: Para Los Ninos- L.A. Metro

Total Responses: 546



Survey Result

Pilot Participant Distribution



Survey Results

Survey data analysis and syntheses produced the following Community Priorities:

Technology: Smart City	**Infrastructure:** Lighting the Neighborhood	**Services:** Access and Awareness
• Safety Cameras 44% • Air Quality Sensors 22% • Wi-Fi 30%	• Lighting Improvements 57% • Safety 19%	• 311 49% • BSL Web 20%

Pilot Summary

The pilot revealed essential community priorities, which were increased safety, and a strong interest in technology, specifically Wi-Fi and Safety-cameras. Also, this exercise revealed challenges to community participation in the form of accessibility and language barriers, explicitly, the ability to reach and connect with stakeholders. The findings underline the importance of multiple tactics and segmentation to reach traditionally marginalized residents. Further, our participation levels demonstrate the need for on-going outreach and the need to design meaningful engagement mechanisms to understand the interests and challenges for all residents. These conversations with stakeholders and vulnerable residents are critical for future discussions on the capabilities of connected infrastructure and digital public services. The community perspective should shape our strategy in parallel with the technology opportunities the future offers. The Bureau will continue to engage the community and explore technology opportunities that enable broader inclusion resulting in more effective community-driven solutions.

Recommendations

The Bureau will develop a community engagement strategy to increase awareness, community participation, and facilitate on-going public engagement. Further, the Bureau will organize future programs and solutions around community priorities informed by this pilot and on-going community engagement activities.

Recommendation Summary

Program & Services	Technology Solutions	Community Engagement	Equity Considerations
Analysis of Service Delivery Model	Expand Safety and Security Solutions	Develop a Community Engagement Strategy	Cultural/linguistically appropriate materials
Increase program awareness	Diverse Beta testing for public Wi-Fi	Design a Communication Plan	Support limited English proficiency
Enhance website for adaptive self-service	Health & Environment Sensors	Develop Accessible Feedback Mechanisms	Address digitally invisible populations

[6] *Digitally invisible populations or non-digital connected communities are those with limited or no access to internet due to affordability factors.*

Outreach with Council District Offices

The Bureau of Street Lighting works closely with the 15 Council Offices throughout the year. We provide annual project summary letters for each district and solicit future requests including priority locations for EV Charger installations, Bus Stop Lighting, and mid-block crosswalk lighting. This enables the Bureau to make project decisions based upon community needs. In this spirit, we developed a survey for our Council Offices to gain insights on community needs and smart city solutions.

Results

Council District Survey Response Rate: 93%

Technology: Smart City	**Infrastructure:** Lighting the Neighborhood	**Services:** Access and Awareness
• Safety Cameras 85% • Air Quality Sensors 58% • Wi-Fi 77%	• Lighting Improvements 61% • Safety 32%	• Lighting Improvement Program 53% • Commercial Use Programs 47%

Recommendations

Based on a synthesis of the survey results, we recommend the following.

Increase Awareness	Accessibility	Safety & Transparency
FAQ	Engage w/ underserved communities	Copper Wire/Power Theft Campaign
Smart City Programs	Outreach to Digitally Invisible groups	Outreach on Special Topics (5G)
Resource Guide	Materials in multiple languages	Project Updates: Vision Zero, etc.

Culture & Innovation Philosophy

Innovation Lab Event

Smart City design starts with the people that design and deliver smart solutions with care and professionalism, the Street Lighting Team. The Bureau held an Innovation Lab with staff from all 14 divisions with various positions to discuss the future of the Street Lighting, which includes exploring all existing challenges and possible opportunities for improvement. The development of this plan incorporates collective input from the event as well as additional workgroup sessions with team members.

The three-hour workshop produced a multitude of ideas and focus areas for growth and development.

Operations	Programs & Services	Capacity Building
System & Data Interoperability (real-time)	Forum for Innovation (Innovation Labs; hackathons)	More trainings and staff development workshops
Systems Enhancements: Coded user profiles based on role	Project Management tools - updates/status	Better Internal Communication Monthly Newsletter; Matrix
Expand Project Coordination: Downtown & Field Teams	Community Engagement: Outreach and Awareness	Develop Cross-functional Teams: Open rotations and strike team opportunities

Community Collaboration

City of Los Angeles Streetlight Contest, L.A. Lights the Way

The City of Los Angeles launched the L.A. Lights the Way streetlight design competition in 2020. The goal of the design competition is to select a new standard streetlight design that connects with the rich design tradition of the Los Angeles streetlights. The competition also incorporates new requirements related to technology and climate and makes room for other community elements. The winning design and its variations will light the streets and sidewalks of Los Angeles. **This competition will conclude in July 2020, and the winning streetlight will be used as the basic design for the City of LA.**

Street Lighting Challenges and Resource Gaps

City's Copper Wire and Power Theft Challenge

Ensuring City's Street Lighting System remains fully operational is especially challenging when faced with copper wire and power theft (CWPT). Theft occurs when the protective cement near the streetlight or the pole itself is damaged to reveal the electrical conduit several inches below the surface. The removal and theft of this copper wire can wipe out an entire street of lights and poses life-threatening electrocution when exposed. As recently as 2016, we have seen an increase in power theft in addition to the copper wire theft. Both wire and power theft cause lengthy periods of lights being out and a significant increase in repair times.

Although copper wire theft has affected the Bureau for many years, today's current incidents have reached critical levels. The CWPT is an issue closely related to our City's homeless crisis. The challenge is resource-intensive and expensive for the Bureau due to additional crews and the cost of repair materials. The Bureau has taken several steps to address the contributing factors, including changes to the Penal Code, community awareness, and installing lockable, vandal-resistant pull boxes. Most recently, the Bureau deployed a CWPT Strike Team to implement a comprehensive CWPT Program for prevention and enforcement efforts. Additionally, the Bureau has requested additional resources in the budget to allow for dedicated crews to respond to wire theft and vandalism outages. **Street Lighting is coordinating with City partners to develop a comprehensive CWPT awareness campaign to fight copper wire and power theft**.

Citywide Ballot Preparation (Prop 218) to balance Lighting Assessments

The Bureau's proactive LED Conversion Program has saved millions in energy costs and continues to generate cost savings; however, the Street Lighting District Assessment model, which funds Bureau operations, is unsustainable for the future. The tax assessments for the City's Street Lighting District Assessment have remained the same since 1996, in compliance with Proposition 218. The Bureau is planning for a citywide ballot to update over 550,000 frozen parcels to current costs in order to properly maintain the City's system of 223,000 streetlights. **The status of a citywide Ballot remains pending.**

Technology Resource Gaps and Opportunities

As with all public services, we face funding constraints and resource challenges. The Copper Wire Theft Response Program is resource intensive. Technology is expensive. Smart solution initiatives must be financially responsible and judiciously managed. The City is taking a broad approach utilizing a variety of funding sources to support Smart City initiatives, including public-private-partnerships and partnerships with telecommunication companies on the 5G Co-Location Program. Street Lighting is pursuing additional grants and partnerships, as well as developing new revenue options such as, "Infrastructure as a Service" (IaaS) model. The Street Light EV Charging Station is an example of IaaS, where revenue directly supports program maintenance. **The Bureau will develop and pilot new revenue models to support operations and new technology solutions**.

Equity and Inclusion

Street lighting is front and center of technology and urbanization in the City. We have exciting new sensor technologies juxtaposed with significant urban challenges: homelessness and the aforementioned copper-wire and power-theft dilemma. We must ask ourselves, are we designing smart solutions across geographic and economic lines? The results from the community pilot (previous section) demonstrate the need for meaningful engagement mechanisms to understand the diverse needs of all residents. These conversations with stakeholders and vulnerable residents are critical to future discussions on the capabilities of connected infrastructure and services. The Bureau will increase outreach to promote access and participation to historically marginalized groups such as limited English proficiency and digitally invisible populations. **The Bureau will explore technology tools that can help foster inclusion and increase accessibility for all residents.**

Equitable Service Outcomes

The Bureau is committed to equitable service outcomes for all City residents. To better meet the needs of disadvantaged Angelenos, the Bureau is piloting new programs to improve the overall quality of street lighting, and the daily experience of residents in impacted areas.

10 Programs for Impacted Areas

11 High Impact Area Pilot New Program

Closely related to the wave of copper wire and power theft (CWPT), the volume of incidents in high impacted neighborhoods often results in long repair times of 30 or more days, which may then have a recurrence within the same week following a repair. For residents, such lengthy repair delays may result in feelings of neglect and disregard by the City. In response, Street Lighting has designed a High Impact Area (HIA) initiative, that aims to improve the overall quality of the street by deploying field teams to perform rapid streetlight restoration. The HIA initiative combines repair and maintenance activities often performed separately, and supplements this combination with outreach to increase awareness of CWPT and street lighting services. A High Impact Area pilot is a holistic approach that combines repair and maintenance programs with community outreach. **The pilot is planned for the Winter of 2021**.

Program Elements:

- Light pole repair maintenance: missing hand hole, damage or graffiti on light poles.
- Tree trimming to improve visibility on sidewalks for pedestrians and vehicular traffic.
- Outreach to educate on the dangers of copper wire/power theft and reporting incidents.
- Data Collection & Analysis: Metrics, tracking incidents and reporting program impact.

9 Public Wi-Fi

In our commitment to achieve equitable service outcomes, the Bureau of Street Lighting is collaborating with partners to increase public access to Wi-Fi in underserved areas. The City's Streetlight system offers a unique opportunity to reach previously digitally invisible communities, with limited or no access to the internet. Providing Access to Wi-Fi will help residents connect to services, employment, education, and many more opportunities to improve their quality of life in Los Angeles. **Street Lighting will be piloting smart lighting poles with Wi-Fi capability and USB ports in 2020-21**.

Free EV Charging

Street Lighting provides free EV charging in South L.A. This program is part of a broader citywide initiative to increase mobility equity, such as LADOT's partnership with BlueLA electric cars, which provides discounts for low-income qualified individuals. **The Bureau expanded this program citywide to assist residents with the financial impact of the COVID-19 pandemic**.

Tree Trimming Expansion

Though often overlooked, city trees are an important element of our sustainability strategy as they provide countless other urban benefits, such as cleaner air and cool shade to fight the urban heat island effect. Overgrowth can block light from streets and sidewalks, creating a safety hazard for motorists and pedestrians. **The Bureau is working closely to coordinate with the Bureau of Street Service's Street Tree Program to target these trees for continuous trimming to help ensure safe and appropriate lighting levels for residents**.

Objectives:

- Explore opportunities to expand Tree Trimming into impacted areas.
- Street Lighting will continue to look innovative ways to increase shade in future designs of our streetlights.
- Identify streetlights that need relocation due to tree conflict.

Pole Painting Expansion

The existing light poles in impacted areas are prone to vandalism and graffiti. Street Lighting is expanding its efforts to freshly repaint vandalized light poles to help improve the appearance and the overall quality of the street. The Bureau's maintenance team completes 1300 freshly painted light poles annually. **We will be developing an expansion strategy in coordination with the 10-year light pole maintenance program to expand the impact citywide**.

Hand-hole Repairs New Program

Streetlight pole handholes (access ports) are frequently vandalized and torn off, which can result in exposed wire hazards. Currently, the team is averaging 60 handhole repairs per month. **We are expanding efforts and projecting 80 monthly handhole repairs by 2021**.

Equity in City Services

Street Lighting works closely with Council Offices to coordinate lighting needs around bus stops and in and around tunnels. Lighting can have additional benefits that protect women/girls (from trafficking or other security issues) in various parts of the City. **The Bureau prioritizes safety lighting needs for vulnerable populations, which is solicited from Council Offices annually**.

Gender Equity

In accord with Mayor Garcetti's Executive Directive 11, Street Lighting has implemented a gender equity plan to achieve gender balance. Our team will enhance the tracking of workforce gender, race, and ethnicity to develop on-going recruitment strategies to address disparities.

Current initiatives underway:

- A recruitment strategy to increase female candidates for engineering and non-traditional field positions.
- Women at Work Series implemented by the Bureau Director (a mentoring and information forum for women within Public Works).
- Partnership with Los Angeles Trade Tech (LATT) to increase women in Electrical Craft Helper positions:
  - Outreach to current female students and alumni.
  - Workshops to assist with application and examination preparation (where applicable).
  - Onsite interviews available for workshop participants.

Broader Active Initiatives

- Ensure recruitment outreach to women, minorities, and LGBTQ communities.
- The Bureau actively recruits for diversity at local, regional, and national colleges and universities.
- We actively outreach and recruit from professional associations and organizations.

Sustainability Practices

The City's "smart lighting" reduces carbon emissions and maintenance costs. To further expand sustainable practices, we are developing and updating new sustainability metrics across all programs and exploring new tools to optimize data collection and reporting capabilities to measure and track sustainability outcomes. Street Lighting will focus on three core sustainability areas: energy management, materials management (supply chain), and operations.

Energy Management Solutions

The City's Street Lighting System is 98% LED technology, which yields annual energy savings 114-gigawatt hours (GWh).[7] The Bureau continues to explore clean energy options and behind-the-meter (BTM) or off-grid solutions that are self-sustaining and do not require grid electrification. This includes our solar lights technology, which generates energy via sunlight with energy storage through the built-in batteries, or can even connect directly back into the electric grid.

[7] GWh is Gigawatt hour and define as 1 billion watts = 1 Gigawatts (GWh);

Current Solutions & Objectives

1. Solar Solutions: Solar Streetlights and Solar to Grid Streetlights.
2. EV Charging Program: Clean Energy Sessions 28,884 (2019-20).
3. Demand Response Program (LADWP): In coordination with the Los Angeles Department of Water and Power (LADWP), Streetlight EV Chargers will be included in their Demand Response Program. Under this program, EV Chargers will be turned off (stop charging) to reduce the energy load at times of peak demand to relieve stress on the power grid. The program runs annually from June 15th through October 15th.

7 Sustainability in Operations

The Bureau will begin exploring data tracking for our Green House Gas (GHG) footprint of field operations, maintenance, and construction, to work towards carbon neutrality.

Current Solutions & Objectives

1. Future fleet additions will consist of energy-efficient vehicles where possible and will develop a plan to achieve full fleet conversion by 2050.
2. Implement new routing software to reduce fleet daily miles.
3. Added swing shift to allow field operations staff to maximize public transportation options.

11 Materials Management

Street Lighting is dedicated to sourcing climate-friendly materials for design and construction and will encourage all vendors to source climate-friendly materials -where possible.

Current Solutions & Objectives

1. Recycle and recover damaged streetlights to re-claim materials for future repairs or restoration by our expert welders for unique and one-of-a-kind designs.
2. Implement Sustainability Score Cards for programs and vendors.
3. Explore cool pavement options at our 5-acre yard to reduce surface temperatures.

Resiliency Planning

The Bureau must ensure the Street Lighting System remains solvent at all times including public emergencies or catastrophic events to ensure uninterrupted service.

Current Solutions & Objectives

Systems and Data

1. Cloud-based backup and disaster recovery solution for System and data.
2. Develop an Emergency Lighting System.

Office/Personnel Resiliency Plan

1. Provide a generator system at the field office to ensure operational continuity during a significant event or power outage.
2. Provide lifesaving training for employees (CPR, Fire Drills, Earthquake, etc.)
3. Bureau Emergency Suite Program to ensure the following
   - Update employee emergency cards and conduct Notify LA test annually.
   - Inventory Supply: Drinking water, food, and personal protective equipment (PPE).
   - Equipment: Annual check of all radios, generator testing, and review of employee emergency stations.

Streetlight Infrastructure Evaluation Initiatives

1. Re-evaluate high use streetlights to ensure foundation/pole integrity meet current AASHTO[8] requirements for resiliency during a significant climatic or seismic event.
2. Test all solar batteries on streetlights every five years.
3. Annual check of emergency systems in the City's large-scale tunnels. (Sepulveda/LAX, Sherman Way, 3rd Street Tunnel, 2nd Street Tunnel, and others)
4. Sepulveda Basin – Annual test of the de-energization of the basin.
5. Emergency Preparedness Plans: Earthquake • Floods • Wildfires • Pandemic

[8] *American Association of State Highway and Transportation Officials (AASHTO):* **transportation.org**

SMART CITY

Los Angeles Network Streetlights
2020-2025

LA Lights: Smart City

The City's Street Lighting System is comprised of 223,000 lights, exceeds 400 different designs, and covers 469 square miles. By comparison, we have more lights than all of the streetlights in Boston, San Diego, San Francisco and Washington, D.C combined. The City's expansion of Smart Streetlights and the rapid development of digital solutions requires careful consideration of capacity, resources and planning to develop and execute a dynamic five-year strategy.

LA Lights will undertake a digital transformation journey to develop a fully adaptive Street Lighting platform for all city lights and digital solutions so as to provide a better-connected Los Angeles now and in the future.

As we develop the Smart City strategy, we aspire to achieve the following goals:

- Maintain the safety and reliability of the street lighting system at all times.
- Partner with our many diverse communities as collaborators in the expansion of our smart city programs.
- Adopt technology that enhances public services and increases inclusion.

This strategic plan focuses on the three areas of Smart City development:

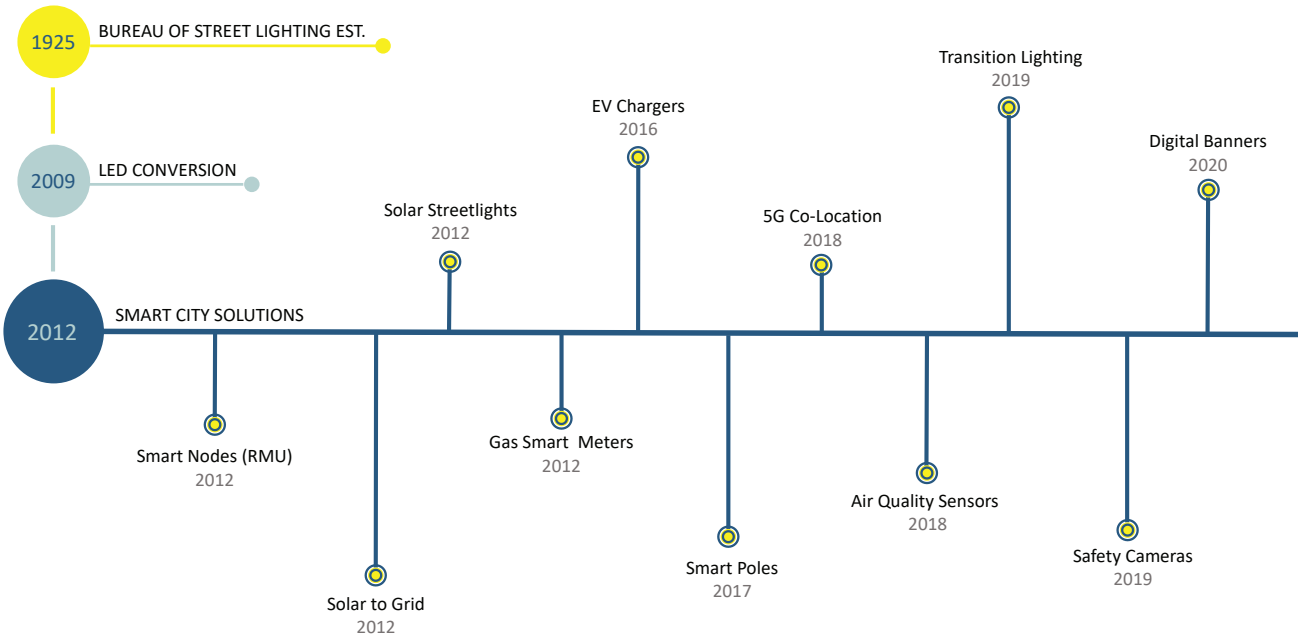
1. Strengthen the City's Street Lighting System
   a. Expand Smart Network Lights
   b. Update Digital Infrastructure: System Platform
2. Expand Smart City Solutions
3. Engage the communities to ensure smart solutions meet their needs.

We adopted five Smart City Principles to embrace applied technologies, express our values, embolden our mission, and exemplify the noble goals of Mayor Eric Garcetti's Sustainable pLAn.

Smart City Principles

1. Pair technology with infrastructure to improve public services.
2. Leverage data to inform program decisions and resource allocation.
3. Develop inclusive, responsive and proactive solutions.
4. Apply technology that enhances the user experience and accessibility.
5. Design solutions to people and City challenges.

Smart City Journey



Smart LA Lights

Our Street Lighting System, including our Network Lights (smart nodes), are managed across various platforms, including the Bureau's internal Asset Management System (AMS), CityTouch, Geographic Information System (GIS) Mapping, Street Viewer, and the City's 311 system.

The Bureau's Smart City Programs, EV Charging, sensor technologies, and more are managed via vendor-proprietary platforms. Managing assets and operations across multiple systems are arduous for staff and partners and will continue to grow in complexity with the City's acceleration of smart infrastructure. A central system platform will enable us to monitor the lighting system and smart city programs, modify workflows and provide real-time data to enhance operations and services outcomes. For successful scalability and to overcome interoperability challenges of the future network, a central platform is now essential. The solution is to identify a data integration tool or Integration Platform as a Service (iPaaS) to be compatible with our smart solutions to enable data accessibility, which involves moving data to-and-from platforms. In short, what is required is an integration tool to allow cloud-based processes, services, applications, and data within or across multiple solutions platforms. This interoperability improves data quality, speed, and open-data sharing. Utilizing an integration tool allows us to remain flexible as new technologies become available and quickly adopt future tools such as Data; IoT; AI; 5G; Sensors; Apps; GPS; Predictive Analytics and Cyber-security.


LA SMART MODE
N Spring St

Beyond the Streetlight: Smart City Solutions

Street Lighting is collaborating on the development and deployment of customized smart city solutions that support the City's digital infrastructure. In addition to monitoring the network streetlights, our Smart City Group (SCG) manages a dynamic portfolio of digital solutions and beta testing of new technologies. These individual smart city programs complement one another, cumulatively ensuring that programmatic goals and our broader milestones in the City's New Green Deal Sustainability pLAn are achieved.

Smart City solutions currently deployed or planned jointly with smart lights include:

1. Air Quality Monitoring Sensors
2. Broadband Connectivity
3. Co-Location (Small Cell) 5G
4. Color Coordination Lighting
5. Digital Banners
6. EV Charging Stations
7. Gas Company Smart Meters
8. Motion Sensors
9. Multi-use (Pedestrian) counters
10. Safety Cameras
11. Seismic Sensors
12. Smart Streetlight Pole
13. Solar Streetlights
14. Solar-to-grid Streetlights
15. Transition Lighting Zones (TLZ)
16. USB Charging
17. Wi-Fi

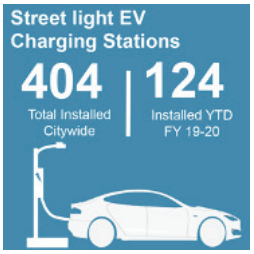
Smart City Portfolio

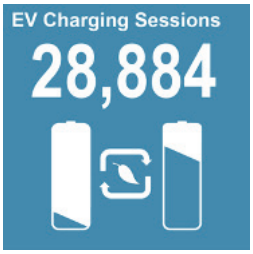
The City's early conversion to energy-efficient LED lights not only revolutionized streetlights, but it also created a seamless platform for the deployment of future smart solutions. Today, the Bureau operates 15 Smart City initiatives, including 5G Co-Location to expand communications, Electric Vehicle (EV) Chargers, and sensor technologies.

11 Streetlight Electric Vehicle (EV) Charging Stations

Innovative curbside Streetlight EV Charging stations attach to the streetlight and utilize the existing circuitry, making them extremely cost-effective. Our first Infrastructure as a Service (IaaS) solution is expanding to meet the mandate set by the Mayor's Sustainable pLAn to increase EV adoption 25%, adding 100,000 new electric vehicles in the City by 2025. **The program will focus on the following areas for 2020-21**:

- Planning and design for 150 new installations
- Explore Multi-Unit Dwelling (MUD) and residential curbside opportunities
- Program efficiencies: reduce costs and increase utilization





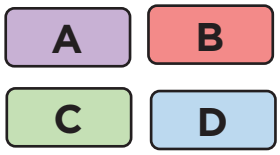
Safety Solutions

9 Transitional Lighting Zones

Transitional Lighting Zones (TLZ) are streetlights programmed to increase illumination levels 30%-50% (brighter) during periods of high-pedestrian traffic, such as following a sporting or entertainment event. Transitional lighting improves visibility and safety for pedestrians and vehicle traffic in immediate areas surrounding venues—the successful L.A. Live TLZ Program is expanding to phase two in 2021. **The Bureau has identified future TLZ sites citywide, including the upcoming design for the Hollywood Bowl location, scheduled for 2021.**

L.A. Live Transitional Lighting Zone

Zones:



TLS Zones may vary in lighting level and type of luminaire based on street classifications.

Multi-Use Counter: Pedestrian and Mobility Counter

Street Lighting is piloting a non-intrusive pedestrian/mobility counter from Eco-Counter.[9] The counter software/technology uses an algorithm to recognize the shapes of pedestrians, cyclists and vehicles. The Eco-Counter transmits the count in real-time, providing data on pedestrian and last mile mobility (bikes/scooters) traffic flow. The counter does not record images. Street Lighting is utilizing this data to ensure adequate lighting levels during high-peak traffic periods. The data insights have a wide variety of unity across city infrastructure and will inform future improvements projects including Smart Poles, Transitional Lighting Zones (TLZ), motion sensors, and other safety enhancements citywide.

Safety-Cameras

A popular smart city solution, safety-cameras support several city programs, and may aide in traffic incidents or security threats. They can assist first-responders to get an up-close view of the landscape in a disaster. **This year Street Lighting deployed safety-cameras for the following programs**:

- In partnership with L.A. Sanitation, we deployed 20 safety-cameras to assist with illegal trash dumping, in support of a broader City campaign to deter illegal dumping in the City.
- Street Lighting deployed four safety-cameras to support the Copper-Wire-Power-Threat (CWPT) initiative. The safety-cameras help deter copper wire and power theft in the City.

[9] *More information is available at* eco-compteur.com.


LA ST LIGHTING
HercRentals

Environment and Health Solutions

3 **Air Quality Monitoring Sensors**

LA Lights is committed to improve the environmental quality of our local neighborhoods and supports Green Zones in Los Angeles. In partnership with AQMD, Street Lighting has installed 18 air quality monitoring sensors supporting data and research for the City's Clean Up Green Up program, which aims to reduce and prevent pollution, in communities with the worst air quality in Los Angeles.[10] Green Zones focus on transforming highly polluted, blighted neighborhoods into greener, more vibrant, healthier communities.

Enhance Communication & Connectivity

9 **Small Cell Communication Attachments: Co-Location (5G)**

Los Angeles is on track to become the first 5G city in the Nation, which will bring superfast internet speed to businesses and residents. Co-Location devices are attached to streetlights to boost network coverage and capacity demands for faster service, streaming, and cloud services. The City works with telecommunication companies on the deployment for co-location to deliver the best service to our many communities and increase communication coverage, especially for use in emergencies. There are currently over 2670 Co-location devices operating citywide. **As the Bureau's fastest-growing program, Co-Location will expand to 3,200 devices in 2020-21**.

[10] *More information is available at cleanupgreenupLA.org*

9 Digital Banners

Currently, streetlights can mount banners and art via our permitting system.[11] Street Lighting will pilot Digital Banners to provide the public with real-time information regarding events or during an emergency event.

9 Smart Poles

Street Lighting is piloting a smart hub pole that offers extensive services including, Wi-Fi, USB Ports, Speaker System, or CCTV. Currently, there is one Smart Hub Pole live for testing.

L.A. Smart Pole Coming in Fall 2020

Smart Pole Features

May include:

- 5G
- Air Quality Sensors
- Digital Banner
- Multi-color Lighting
- Pedestrian & Mobility Counter
- USB
- Wi-Fi

Smart City Considerations

Smart City is one concept of many that contribute to the safety, growth, and innovation within the City and around us. Smart solutions help us deliver public services and offer a suite of programs with immense potential. We have also learned smart solutions require new considerations in the context of City services, open data, and equity, to name just a few.

[11] *More information is available at B.S.L..lacity.org*

Innovation and Community

Home to Silicon Beach, Los Angeles has the third-largest pool of tech workers on the West Coast, behind Seattle and San Francisco. The City has developed tools to support and foster tech innovation including a business tax specifically for tech companies, the Technology and Innovation Council, and the LA Tech Talent Pipeline. Our City's diverse communities also offer a unique advantage to gain experience and insights from around the world. We are indeed a Smart City.

Engaging locally generates diverse input on local solutions and increases inclusion. In this spirit, Street Lighting has invited the community to design smart infrastructure with a first of its kind, LA Lights the Way, Street Light Design Contest. The open competition will determine the next standard city streetlight.

Local Innovation Opportunities

1. Inspire the market beyond lighting technology to combine luminaire lamp design with the Internet of Things (IoT) capabilities.
2. Engage L.A.'s technology community's interest in connected infrastructure, offer beta testing zones to stir design interest and enhance market competitiveness.
3. Create more opportunities to engage and learn more about our residents, businesses, schools, and community organizations.
4. Strengthen partnerships and collaboration with the Department of Transportation, Department of Water and Power, Public Works' Bureaus, and other City Departments.

Community Inclusion

The results from our community pilot (see previous section) demonstrated the need for meaningful engagement mechanisms to understand the diverse needs of all residents. Creating meaningful dialogues with stakeholders and vulnerable residents is critical to foraging trust and partnerships in our development of connected infrastructure and services. The Bureau will increase outreach to promote participation from historically marginalized groups such as limited English proficiency and digitally invisible populations. We will utilize technology to foster inclusion and increase access to services for all residents.

8 Workforce Innovation: New Tools for New Teams

The implementation of new technologies and digital services demands the expansion of roles and staff capabilities. Therefore, the Bureau will prepare to integrate new multi-sector professionals, including programmers, software engineers, and data analysts to help navigate new technologies. We will work to incorporate new subject-matter-experts, technology training, and additional capacity-building resources for our staff.

Lights on the Data Practices & Policy

As we increase our dependency on [data] technology to identify problems and solutions, we must consider the impact of smart city data. Smart solutions can provide large data sets which, combined with reporting tools, can generate data on the utilization of public services. A few potential considerations include individual privacy and public access to data. The Bureau of Street Lighting does not collect or store any individual data from our smart city programs. Public privacy and safety are paramount. We are currently evaluating data practices and policies to ensure the highest protection for personal privacy. (Topic directly addressed in our Digital Infrastructure Strategy section).

Smart City Road Map

The Bureau's goal is to develop a fully adaptive Street Lighting Platform for all city lights and connected service solutions. The LALights: Smart City Strategic Plan 2025-2030, highlights the objectives and actions to expand our smart city capabilities, strengthen our digital infrastructure and facilitate community-driven solutions for a better-connected Los Angeles now and in the future.

The following plan outlines a 5-year growth strategy towards achieving a fully connected streetlight system in the future. We begin with the growth strategy of our network [connected] lights, followed by the expansion of our smart city programs, and third outlines a digital transformation framework. The subsequent sections integrate sustainable practices and a community approach. The final section defines the steps of our plan implementation.

The Smart City Path

I. **Smart Infrastructure**
   1. Expand Network Streetlights: Connected Streetlights
   2. Develop Digital Solutions: Smart City Programs

II. **Digital Infrastructure Transformation**
   3. Master Platform (Interoperability)
      a. a. Data Policy & Practices
   4. Digital Solutions: World Class Website

III. **Sustainable Operations**
   5. Sustainability & Resiliency
      a. Infrastructure Improvements

IV. **Smart City Communities**
   6. Connections, Inclusion and Equity
   7. Research, Innovation and Culture

V. **Implementation**
   8. Action Plans

Smart City Strategic Plan for Operational Excellence & Innovation 2020-2025

LA Lights is building a world-class Street Lighting Platform for all City lights and connected service solutions for a better-connected Los Angeles today and in the future.

I. Smart City Infrastructure

1. Expand Street Lighting Network Capacity

The City's Street Lighting System is 223K, of which currently only 37K are network connected. The expansion of smart nodes will strengthen network capacity.

Goal	• Engage with underserved communities.
Strategy	• Expand the network streetlight capacity through smart node connections.
Actions	• Perform system inventory and cost analysis to determine network scalability. • Design and execute deployment strategy for 44K smart nodes by 2025. • Develop a transition plan to integrate existing (smart node) network data into an asset management system (AMS).
Outcomes	• **Design forecast and cost analysis tools to manage smart [node] light expansion.** • **Increase the City's connect "smart" lighting network by 2025.** • **Fully interoperable data-rich system to inform daily monitoring and reporting.**

2. Develop Smart City Solutions: Smart City Portfolio

Expand and improve smart city initiatives to increase service outcomes and sustainability practices.

Goal	• Advance our digital service solutions and improve the quality of life for residents.
Strategy	• Standardize Smart City Programs goals, metrics, funding, data tracking, and evaluation.
Actions	• Program Management Plan (PMP) outlining goals, metrics, funding, evaluation, and tracking on sustainability goals, i.e., energy savings. • Develop robust cost evaluation and benefit analysis; expected Return on Investment (ROI).
Outcomes	• **PMP for all Smart City Programs.** • **Pilot Infrastructure as a Service (IaaS) and other alternative funding models to support Smart City Portfolio.**

Photo: Rudy Espinoza

Smart City Portfolio Expansion 2020-2025

Smart City Program Goals	Timeline					
	2020	2021	2022	2023	2024	2025
Smart Nodes	37k	38k	39k	41k	42k	44k
Co-Location	3200	3700	4200	4500	4800	5100
EV Charging Station	430	580	730	880	1030	1180
Transitional Lighting Zones	2	3	4	6	8	10
Motion Sensors	10	20	30	40	50	60
Safety-cameras	20	30	40	50	60	70
Multi-use Counter	10	12	14	16	18	20
Digital Banners	5	10	15	20	25	30

*Data reflects the end of year outcomes.

II. Digital Transformation Journey

3. Develop Master Platform for all Smart Lights and Digital Solutions

Street Lighting's successful implementation of smart lighting and solutions necessitates a new system platform to allow adaptive monitoring for the lighting system and growing smart solutions in preparation for tomorrow's digital ecosystem.

Goal	• World-class control platform for all streetlights and smart city solutions.
Strategy	• Develop a new system platform to integrate data, upgrade legacy systems and transition data and workloads to the cloud for maximum system performance.
Actions	• Develop a data integration framework for a central platform compatible with the City's street lighting system and smart city solutions. • Update system interoperability to improve live data and project tracking capabilities, workflow and project management across programs/ operations. • Define the requirements for open API for Smart City products. • Explore integration requirements to advance existing streetlight management systems including GIS integration with CAD. • Define web integration points to streamline service requests, repair status, and data access (real-time) for dashboards. • Develop online Materials Management Procurement System. • Develop a robust cyber-security framework to protect against breach or systemic failure. • Approve digitalization plan to achieve full (100%) digital conversation and file storage bureau wide (i.e. Online Patrol Map Conversion).
Outcomes	• **Design a central dashboard to manage and monitor all smart city solutions.** • **Pilot new workflow system across services and project work orders.** • **Develop an open API for Smart City products.** • **On-going system advances to support the best streetlight system, including GIS and CAD integration and other productivity tools.** • **Provide real-time data access on smart city initiatives.** • **Pilot web Materials Management Procurement System.** • **Safe and secure system and data management.** • **Achieve 100% digital file storage Bureau wide - by 2020-21.**

A. Smart City Data Policy and Practices

Smart City programs can create data on the use of public services. The privacy and security of our community is our utmost concern and is crucial to preserving public trust. Street Lighting does not collect or store any data not relevant to the functioning of our streetlights. The Bureau complies with the City of Los Angeles' general privacy policy.[12]

Goal	• Transparent policies and practices on data sharing, open data access, and public privacy.
Strategy	• Define smart city data policy framework and enhance data collection tools and reporting capabilities to facilitate seamless open data access.
Actions	• Create new data collection protocols such as anonymous metadata requirements, and tools to enhance open data accessibility. • Coordinate with City's Information Technology Agency (ITA) on data policy to develop a framework to govern privacy, data practices, and public data access. • Smart City product design and beta testing guidelines, policy and anonymous metadata requirements. • Define program data points for public access on the LA Lights website and the City's Open Data Portal.
Outcomes	• **Implement new data collection and reporting protocols for connect solutions, i.e. multi-use counters.** • **Establish digital rights practices for the collection, use, and protection of data.** • **Publish Smart City data policy, best practices, and access guidelines.** • **Share appropriate Smart City data on website and/or City's Data Portal.**

[12] *More information is available on the ITA website* **ita.lacity.org**

4. Digital Solutions: Develop A World-Class Website

The Bureau provides several online services including program and service requests, B-permits via ePlan LA (portal), and of particular interest, information on our Streetlight Museum. Our site is often the first touchpoint for the public; Street Lighting receives inquiries from cities around the world regarding our smart lights. This digital transformation strategy creates new web capabilities,

Goal	• A world-class website with real-time-data access and extremely efficient service solutions, and customer support.
Strategy	• Design a customer journey for users with usability, interactivity and advanced digital services.
Actions	• Analysis of current website capabilities, content and online services to inform new design and resources. • Develop a website redesign plan, including service points, content guidelines, and self-service tools, such as messenger or chatbots' options. • Develop and implement an online portal for council offices and neighborhood councils to track project status and submit project proposals. • Establish website Project Management Plan (PMP) to manage content and functions.
Outcomes	• **Launch an intuitive data-rich webpage with enhanced digital service solutions for all stakeholders.** • **Develop customer tools such as information videos to guide permit/plan checking, CWT, FAQ on 5G, and other service or topics.** • **Launch a reliable system platform for council offices and city partners to access projects and data updates.** • **Implement website PMP to manage updates i.e. events, data links, Design lighting guidelines, user feedback, etc.**

III. Sustainable Operations

5. Sustainability and Resiliency Practices

The following address infrastructure needs and the challenges of connected infrastructure, subject to vulnerabilities, physical and cyber. Both require durable measures to ensure the integrity of the Street Lighting system in a crisis or emergency. Together, sustainability and resiliency practices increase benefits to the City while minimizing short and long-term impacts on the environment.

Goal	• Achieve fully Sustainable and Resiliency Practices.
Strategy	• Incorporate sustainability principles and resiliency practices into all programs and digital solutions.
Actions	• Determine sustainability and resiliency metrics across programs and initiatives. • Establish a cloud-based back-up and disaster recovery solution with a cloud-based computing platform available on-demand for emergency operations. • Design an emergency lighting system to operate in a crisis or disaster event. • Explore additional behind-the-meter (BTM) solutions, including solar technology that may be used with streetlight system. • Define vendor performance standards to measure and report on sustainability outcomes. • Explore routing software options to reduce daily miles to support net-zero carbon goals.
Outcomes	• **Implement sustainability and resiliency scorecards across programs.** • **Implement a cloud-based disaster recovery system. Implement annual test schedule.** • **Launch Emergency Lighting System.** • **Pilot Energy Sustainability Solutions including off-grid energy solutions.** • **Implement vendor/partner score cards.** • **Pilot routing software cohorts.**

A. Streetlight Infrastructure Sustainability

Infrastructural review and analysis to ensure the integrity of the Streetlight System.

Goal	• Ensure the Sustainability of the Street Lighting Infrastructure.
Strategy	• Implement infrastructural planning initiatives and programs to manage Street Lighting aging assets.
Actions	• Design strategy for fleet replacement with energy-efficient vehicles targeting full fleet conversion by 2050. • Complete a comprehensive field office/5-acre yard assessment to determine warehouse relocation/expansion requirements. • Design Infrastructure Integrity Management Program for all Streetlight Infrastructure Evaluation Initiatives, Program Evaluation and analysis required. • Develop Office/Personnel Resiliency Plan to direct emergency resources and planning activities.
Outcomes	• **Adopt vehicle replacement strategy to achieve a complete fuel-efficient vehicle fleet by 2050.** • **Identify and approve new field office/warehouse location.** • **Implement Infrastructure Plans: 10-year Light Pole Painting Plan; 75-year Infrastructure Restoration Plan and more.** • **Implement Office Resiliency Plan and update all Bureau disaster and recovery plans.**

IV. Smart City Communities

6. Community Connections, Inclusion & Equity

Smart City solutions offer many digital tools to help connect with our stakeholders. Our outreach results (prior section) demonstrate the importance of inclusive engagement to understand the diverse needs of all communities. Creating partnerships with Neighborhood Councils and residents is the best approach to ensure we design equitable service solutions to meet their needs.

Goal	• Strong community connections that foster inclusion and equity.
Strategy	• Optimize community connection pathways to learn and develop solutions that meet the community's current and future needs.
Actions	• Create a community engagement model to guide outreach activities. Track and measure the impact. • Incorporate equity and inclusion considerations into outreach campaigns to ensure access from underserved communities. • Design inclusive feedback channels for ongoing community input. • Pilot/beta test Smart City solutions in underserved areas. • Explore technology opportunities to increase broadband access in underserved areas and support City's broader Digital Inclusion Fund (DIF).
Outcomes	• **Design a Community Engagement Program.** • **Diverse outreach across geographic, social-economic and racial boundaries.** • **Design engagement mechanisms to support community-driven solutions.** • **Equitable distribution of smart solutions across council districts, including underserved areas.** • **Coordinate with Partners to pilot internet and other technology solutions in underserved areas. Continue to support the City's DIF.**

7. Research, Innovation and Culture

Smart City design starts with the people that design and deliver smart solutions with care and professionalism, the Street Lighting Team. The Bureau held an Innovation Lab with staff from all 14 divisions to discuss Smart City opportunities. The development of this plan incorporates collective input from the event as well as additional workgroup sessions with team members.

Goal	• Support Street Lighting's Innovation Culture.
Strategy	• Establish an Innovation Group to foster creativity, promote new ideas and advance a culture of collaboration.
Actions	• Establish a cross-division Innovation Group to identify opportunities to improve productivity, remove barriers and address high priority issues. • Strengthen Public-Private Partnerships (P3s) to enhance sustainable infrastructure and increase benefits to citizens and communities. • Develop future role classification and advocate for improvements to the City's hiring process to prepare for the smart city workforce. • Continue to invest in workforce readiness resources including deployment of laptops, smart phones, and issuing City email and D-time for field crews to advance "remote worker" capabilities.
Outcomes	• **Design a formal innovation lab platform to manage and streamline new ideas, track and share outcomes.** • **Redesign Public-Private Partnership models to include sustainability metrics and to increase public/community benefit.** • **Design recruitment strategy to incorporate programmers, software engineers, and data scientist positions.** • **Develop Workforce Readiness Workplan to manage training, courses, and funding resources.**

V. Strategy Implementation

8. Implementation Plan

Smart City Road Map implementation activities require coordination and support across the Bureau. The action planning will be led by a Bureau Strategy Advisor who will direct the working groups to achieve year one outcomes and future phase planning. All objectives and outcomes are contingent upon current operations needs and available resources.

Goal	• Smart City Road Map Implementation.
Strategy	• Define the implementation phase, including action plans, team members, and timeline to track plan delivery.
Actions	• Create a Smart City Action Plan and identify working group members. • Update smart city portfolio cost and impact analysis. • Define Smart City Plan implementation and measuring impact annual review and reporting protocols • Create a succession plan for Smart City group to ensure on-going success. • Develop a timeline and implementation plans for all goals outlined in this plan.
Outcomes	• **Smart City Road Map Action Plan.** • **Revise Smart City Plan.** • **Publish Smart City Annual Update.** • **Smart City Succession Plan.** • **Design a Strategic Plan Implementation Template.**

The Future is Bright

Street Lighting continues to push forward on digital solutions and smart city projects. Our programs are stimulating new thinking around smart and sustainable infrastructure, locally and internationally. LA Lights is convening a series of events to connect with City partners, utilities, industry, and the community. The Bureau is coordinating with City partners on goals and strategies to support major international events, the World Cup 2026, and the Summer Olympics, LA2028.

The following are a few major upcoming events

- Street Lighting will host the inaugural LA Lights Smart City Conference 2020
- LA Lights the Way, Street Light Design Contest - July 2020
- Super Bowl LVI 2022
- Bureau of Street Lighting Centennial Celebration 1925-2025
- FIFA World Cup 2026
- LA2028 Olympic and Paralympic Games 2028

This Smart City Roadmap is the beginning of our journey to an intelligent Street Lighting Network, and the future we are yet to imagine. LA Lights leads the ecosystem of City departments around a connected city working to strengthen the unseen bonds of “connectivity” lighting the way. Technology is awesome, but cities are still all about people. As we pursue these goals, our approach will be centered around people, our residents, businesses, and visitors to ensure solutions meet their needs neighborhood to neighborhood.

Acknowledgments

Mayor Eric Garcetti

Office of Mayor Eric Garcetti

Barbara Romero, Deputy Mayor, Infrastructure

Nicholas Ryu, City Services, Infrastructure Policy Analyst

Los Angeles City Council

President Nury Martinez, Sixth District

President Pro Tempore Joe Buscaino, Fifteenth District

Assistant President Pro Tempore David E. Ryu, Fourth District

Gilbert Cedillo, First District

Paul Krekorian Second District

Bob Blumenfield, Third District

Paul Koretz, Fifth District

Monica Rodriguez, Seventh District

Marqueece Harris-Dawson, Eighth District

Curren D. Price, Jr, Ninth District

Herb J. Wesson, Jr., Tenth District

Mike Bonin, Eleventh District

John Lee, Twelfth District

Mitch O' Farrell, Thirteenth District

Fourteenth District - Vacant

Board of Public Works

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Aura Garcia, Board of Public Works, Vice President

Dr. Michael R. Davis, President Pro Tempore

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Community Services Division Team
Innovation Lab Participants, December 2019

Appendices

TABULATION OF ALL GOALS IN THIS REPORT

Smart City Goals Timeline

1. Expand Street Lighting Network Capacity

Goal: Grow the City's Network Lights 20% by 2025.
Strategy: Expand the network streetlight capacity through smart node connections.

Action	Outcome	Timeline					
		2020	2021	2022	2023	2024	2025
Perform system inventory and cost analysis to determine network scalability.	Design forecast and cost analysis tools to manage smart [node] light expansion.	**January Completed**					
Design and execute deployment strategy for 44K smart nodes by 2025.	Increase the City's connect "smart" lighting network by 2025.		**December**				
Develop a transition plan to integrate existing (smart node) network data into an Asset Management System (AMS).	Fully interoperable data-rich system to inform daily monitoring and reporting.	**December**					

2. Develop Smart City Solutions: Smart City Portfolio

Goal: Advance our digital service solutions and improve the quality of life for residents.
Strategy: Standardize Smart City Programs goals, metrics, funding, data tracking, and evaluation.

Action	Outcome	Timeline					
		2020	2021	2022	2023	2024	2025
Program Management Plan (PMP) outlining goals, metrics, funding, evaluation, and tracking on sustainability goals, i.e., energy savings.	PMP for all Smart City Programs.			**January**			
Develop robust cost evaluation and benefit analysis; Return on Investment (ROI).	Pilot additional Infrastructure as a Service (IaaS) and alternative funding models to support Smart City Portfolio.				**January**		

Smart City Program Goals* 2020-2025	2020	2021	2022	2023	2024	2025
Smart Nodes	37k	38K	39K	41K	42K	44K
Co-Location	3200	3700	4200	4500	4800	5100
EV Charging Station	430	580	730	880	1030	1180
Transition Lighting Zones	2	3	4	6	8	10
Motion Sensors	10	20	30	40	50	60
Safety-cameras	20	30	40	50	60	70
Multi-use Counter	10	12	14	16	18	20
Digital Banners	5	10	15	20	25	30

**Data reflects the end of year outcomes.*

3. Develop Master Platform for all Smart Lights and Digital Solutions

Goal: World-class control platform for all streetlights and smart city solutions.
Strategy: Develop a new system platform to integrate data, upgrade legacy systems and transition data and workloads to the cloud for maximum system performance.

Action	Outcome	Timeline					
		2020	2021	2022	2023	2024	2025
Develop a data integration framework for a central platform compatible with the City's street lighting system and smart city solutions.	Design a central dashboard to manage and monitor all smart city solutions.					**January**	
Update system interoperability to improve live data tracking capabilities, workflow and project management across programs/operations.	Pilot new workflow system across programs and services -project work orders.					**March**	
Define the requirements for open API for Smart City products.	Develop an open API for Smart City products.			**January API test**			
Explore integration requirements to advance existing streetlight management systems including GIS integration with CAD.	On-going system advances to support the best streetlight system and tools. The including GIS and CAD integration and other productivity tools.					**April**	
Define web integration points to streamline service requests, repair status, and data access (real-time) for dashboards.	Provide real-time data access on smart city initiatives to the extent possible.			**August**			
Develop online Materials Management Procurement System.	Pilot web Materials Management Procurement System.				**January**		
Develop a robust cyber-security framework to protect against breach or systemic failure.	Safe and secure system and data management.	**January Complete**					
Approve digitalization plan to achieve full (100%) digital conversation and file storage bureau wide (i.e. Online Patrol Map Conversion).	Achieve 100% digital file storage Bureau wide -by FY 2020-21			**January**			

A. Smart City Data Policy and Practices

Goal: Transparent policies and practices on data sharing, open data access, and public privacy.
Strategy: Define smart city data policy framework and enhance data collection tools and reporting capabilities to facilitate seamless open data access.

Action	Outcome	Timeline					
		2020	2021	2022	2023	2024	2025
Create new data collection protocols such as anonymous metadata requirements, and tools to enhance open data accessibility.	Implement new data collection and reporting protocols for connect solutions, i.e. multi-use counters.			**June**			
Coordinate with City's Information Technology Agency (ITA) on data policy to develop a framework to govern privacy, data practices, and public data access.	Establish digital rights practices for the collection, use, and protection of data.	**On-going**					
Smart City product design and beta testing guidelines, policy and anonymous metadata requirements.	Publish Smart City data policy, best practices, and access guidelines.			**January**			
Define program data points for public access on the LA Lights website and the City's Open Data Portal.	Share appropriate Smart City data on website and/or City's Data Portal.		**July**				

4. Digital Solutions: Develop A World-Class Website

Goal: A world-class website with real-time-data access and supremely efficient service solutions, and customer support.
Strategy: Design a customer journey for users with usability, interactivity and supreme digital services.

Action	Outcome	Timeline					
		2020	2021	2022	2023	2024	2025
Analysis of current website capabilities, content and online services to inform new design and resources.	Launch an intuitive data-rich webpage with enhanced digital service solutions for all stakeholders.		**October**				
Develop a website redesign plan, including service points, content guidelines, and self-service tools, messenger or chatbots' options.	Develop customer tools such as information videos to guide permit/ plan checking, CWT, FAQ on 5G, and other service or topics.				**June**		
Develop and implement an online portal for council offices and neighborhood councils to track project status and submit project proposals.	Launch a reliable system platform for council offices and city partners to access projects and data updates.			**January - Ongoing**			
Establish website Project Management Plan (PMP) to manage content and functions.	Implement website PMP to manage updates i.e. events, data links, Design lighting guidelines, user feedback, etc.		**March**				

5. Sustainability and Resiliency Practices

Goal: Achieve fully Sustainable and Resiliency Practices.
Strategy: Incorporate sustainability principles and resiliency practices into all programs and digital solutions.

Action	Outcome	Timeline					
		2020	2021	2022	2023	2024	2025
Determine sustainability and resiliency metrics across programs and initiatives.	Implement sustainability and resiliency scorecards across programs.				May		
Establish a cloud-based back-up and disaster recovery solution with a cloud-based computing platform available on-demand for emergency operations.	Implement a cloud-based disaster recovery system. Implement annual test schedule.	January - Complete					
Design an emergency lighting system to operate in a crisis or disaster event.	Launch Emergency Lighting System.						May
Explore additional behind-the-meter (BTM) solutions, including solar technology that may be used with streetlight System.	Pilot Energy Sustainability Solutions including off-grid energy solutions.					April	
Define vendor performance standards to measure and report on sustainability outcomes.	Implement vendor/partner score cards.				June		
Explore routing software options to reduce daily miles to support net-zero carbon goals.	Pilot routing software cohorts.		March				

A. Streetlight Infrastructure Sustainability

Goal: Ensure the Sustainability of the Street Lighting Infrastructure.
Strategy: Implement infrastructural planning initiatives and programs to manage Street Lighting aging assets.

Action	Outcome	Timeline					
		2020	2021	2022	2023	2024	2025
Design strategy for fleet replacement with energy-efficient vehicles targeting full fleet conversation by 2050.	Adopt vehicle replacement strategy to achieve a complete fuel-efficient vehicle fleet by 2050.			June			
Complete a comprehensive field office/5-acre yard assessment to determine warehouse relocation/ expansion requirements.	Identify and approve new field office/ warehouse location.		May				
Design Infrastructure Integrity Management Program for all Streetlight Infrastructure Evaluation Initiatives, Program Evaluation and analysis required.	Implement Infrastructure Plans: 10-year Light Pole Painting Plan; 75-year Infrastructure Restoration Plan and more.			August			
Develop Office/Personnel Resiliency Plan to direct emergency resources and planning activities.	Implement Office Resiliency Plan and update all Bureau disaster and recovery plans.				October		

6. Community Connections, Inclusion & Equity

Goal: Strong Community Connections that foster inclusion and equity across services.
Strategy: Optimize community connection pathways to learn and develop solutions that meet the community's current and future needs.

Action	Outcome	Timeline					
		2020	2021	2022	2023	2024	2025
Create a community engagement model to guide outreach activities, track and measure the impact.	Design Community Engagement Program.	**January Completed**					
Incorporate equity and inclusion considerations into outreach campaigns to ensure access from underserved communities.	Diverse outreach across geographic, social-economic and racial boundaries.		**April**				
Design inclusive feedback channels for on-going community input.	Design engagement mechanisms to support community-driven solutions.		**July**				
Pilot/beta test smart city solutions in underserved areas.	Equitable distribution of smart solutions across council districts, including underserved areas.	**January Completed**					
Explore technology opportunities to increase broadband access in underserved areas and support City's broader Digital Inclusion Fund (DIF).	Coordinate with Partners to pilot internet and other technology solutions in underserved areas. Continue to support the City's DIF.			**January**			

7. Research, Innovation and Culture

Goal: Support Street Lighting's Innovation Culture.
Strategy: Innovation Group to foster creativity, promote new ideas and advance a modern collaborative culture.

Action	Outcome	Timeline					
		2020	2021	2022	2023	2024	2025
Establish a cross-division Innovation Group to identify opportunities to improve productivity, remove barriers and address high priority issues.	Design a formal innovation lab platform to manage and streamline new ideas, track and share outcomes.		**January**				
Strengthen Public-Private Partnerships (P3s) to enhance sustainable infrastructure and increase benefits to citizens and communities.	Redesign Public-Private Partnership models to include sustainability metrics to increase public/community benefit.		**May - Ongoing**				
Develop future role classification and advocate for improvements to the City's hiring process to prepare for the smart city workforce.	Design recruitment strategy to incorporate programmers, software engineers, and data scientist positions.					**March**	
Continue to invest in workforce readiness resources including deployment of laptops, smart phones, and issuing City email and D-time for field crews to advance "remote worker" capabilities.	Develop Workforce Readiness Workplan to manage training, courses, and funding resources.		**May**				

8. Implementation Plan

Goal: Smart City Road Map Implementation.
Strategy: Define the implementation phase, including action plans, team members, and timeline to track plan delivery.

Action	Outcome	Timeline					
		2020	2021	2022	2023	2024	2025
Create a Smart City Action Plan and identify working group members.	Smart City Road Map Action Plan.	**August**					
Update smart city portfolio cost and impact analysis.	Revise Smart City Plan.		**March**				
Define Smart City Plan implementation and measuring impact annual review and reporting protocols.	Publish Smart City Annual Update.		**July**				
Create a succession plan for Smart City group to ensure on-going success.	Smart City Succession Plan.		**February**				
Develop a timeline and implementation plans for all goals outline in this plan.	Design a Strategic Plan Implementation Template.		**April**				

Street Lighting Aligns with the United Nation Sustainable Development Goals (UN SDGs)

1. **No Poverty**
   - End Poverty in all its forms everywhere
     - **Pg. 20**, Bridge Home streetlighting improvements
2. **Zero Hunger**
   - End hunger, achieve food security and improved nutrition and promote sustainable agriculture
3. **Good Health and well-being**
   - Ensure healthy lives and promote well-being for all at all ages
     - **Pg. 19**, Vision Zero
     - **Pg. 20**, Bridge Home streetlighting improvements
     - **Pg. 21**, Tunnel Underpass LED Lighting Improvement Program (TULLIP)
     - **Pg. 35**, Equity in City Services
     - **Pg. 38**, Resiliency Planning
     - **Pg. 44**, Safety-Cameras
     - **Pg. 46**, Air Quality Monitoring Sensors
4. **Quality Education**
   - Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all
5. **Gender Equality**
   - Achieve gender equality and empower all women and girls
     - **Pg. 36**, Gender Equity

6. **Clean Water and Sanitation**
   - Ensure availability and sustainable management of water and sanitation for all

7. **Affordable and Clean Energy**
   - Ensure access to affordable, reliable, sustainable and modern energy for all
     - **Pg. 34**, Free EV charging
     - **Pg. 35**, Equity in City Services
     - **Pg. 36**, Sustainability Practices
     - **Pg. 36**, Energy Management Solutions (Solar to grid programs)
     - **Pg. 37**, Sustainability in Operations
     - **Pg. 43**, Streetlight Electric Vehicle (EV) Charging Stations
     - **Pg. 47**, Smart Pole
     - **Pg. 57**, Streetlight Infrastructure Sustainability

8. **Decent Work and Economic Growth**
   - Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all
     - **Pg. 48**, Workforce Innovation

9. **Industry Innovation and Infrastructure**
   - Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation
     - **Pg. 17**, Smart Nodes (Remote Monitoring Units)
     - **Pg. 23**, 5G Co-Location (zone map)
     - **Pg. 34**, Public Wi-Fi
     - **Pg. 42**, Beyond the Streetlight: Smart City Solutions
     - **Pg. 43**, Transitional Lighting Zones
     - **Pg. 46**, Small Cell Communication Attachments: Co-Location (5G)
     - **Pg. 47**, Digital Banners
     - **Pg. 47**, Smart Pole
     - **Pg. 44**, Multi-Use Counter: Pedestrian and Mobility Counter

10. **Reduced Inequalities**
    - Reduce inequality within and among countries
      - **Pg. 27**, Community Outreach
      - **Pg. 34**, Programs for impacted areas: tree trimming schedule, light pole installation, paint maintenance, handholds repair
      - **Pg. 34**, Public Wi-Fi
      - **Pg. 34**, Free EV charging (underserved areas)

11. **Sustainable Cities and Communities**
    - Make cities and human settlements inclusive, safe, resilient and sustainable
      - **Pg. 27**, Community Outreach
      - **Pg. 43**, Transitional Lighting Zones
      - **Pg. 34**, Programs for impacted areas
      - **Pg. 17**, Smart Nodes (Remote Monitoring Units)

- **Pg. 43**, Streetlight Electric Vehicle (EV) Charging Stations
- **Pg. 36**, Energy Management Solutions (solar to grid panels)
- **Pg. 37**, Materials Management
- **Pg. 38**, Resiliency Planning
- **Pg. 44**, Multi-Use Counter: Pedestrian and Mobility Counter
- **Pg. 46**, Air Quality Monitoring Sensors

12. Responsible Consumption and Production

- Ensure sustainable consumption and production patterns
  - **Pg. 37**, Materials Management

13. Climate Action

- Take urgent action to combat climate change and its impacts*

14. Life Below Water

- Conserve and sustainably use the oceans, seas and marine resources for sustainable development

15. Life on Land

- Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss

16. Peace, Justice, and Strong Institutions

- Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels

17. Partnerships for the Goals

- Strengthen the means of implementation and revitalize the global partnership for sustainable development

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