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# CITY OF LOS ANGELES

CALIFORNIA



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February 20, 2026

The Honorable City Council, City of Los Angeles  
c/o City Clerk,  
City Hall Room 395  
Attention: Councilmember Eunisses Hernandez

**COUNCIL FILE: 25-1350 - REPORT ON INITIAL ASSESSMENT AND RECOMMENDATIONS  
RE: REPURPOSING ELECTRICAL CONDUITS FROM SOLAR-TO-BATTERY STREET  
LIGHT CONVERSIONS**

The Bureau of Street Lighting operates and maintains a network of over 200,000 street lights connected to the power grid by over 7,000 miles of underground electrical conduit. This extensive system was built and in many cases rebuilt piece-by-piece (assessment district by assessment district) over the course of more than 100 years. Taken together, the network represents a massive multi-generational infrastructural asset – if the Bureau were to rebuild this system today, just the underground conduit alone would cost over \$1.8 Billion dollars to install (the Bureau’s average contracted cost for building such conduit is \$45-55 per linear foot.).

Unfortunately, this network is currently under assault from theft and vandalism. The rapidly-rising value of copper has led to an explosion in wire theft incidents on the street lighting network, with thieves breaking into access points and pulling the wire from the poles and underground conduit. This has dramatically increased both costs and response times for BSL lighting maintenance and restoration, leaving many communities in the dark for extended periods of time. The Bureau is looking at all possible remedies, from a new Assessment to reflect today’s realities, to new technologies that fundamentally change how BSL operates.

On new technologies, advancements in solar and batteries have brought down the per-unit cost, size and weight of solar-to-battery light fixture technology, while increasing the dependable service life to 10+ years (the Bureau’s current per-unit assumption is \$6,500 per light, installed).

This presents a viable lighting solution that is disconnected from the power grid and therefore completely immune to wire theft. As such the Bureau has been increasingly deploying solar-to-battery lighting systems in communities hardest-hit by theft, to great success; to date 1,402 units have been installed since the programs began in FY23/24. While not a panacea response to copper wire theft (for example: solar-to-battery lights are still relatively expensive, they must have ample sun exposure, and they do not currently meet the Bureau's standards for illumination for major streets), the Bureau plans to continue to expand the deployment of solar-to-battery light fixtures throughout many parts of the City.

With these existing and forthcoming investments in solar fixtures, the City has a potential opportunity to repurpose underground electrical conduit for other uses that are not vulnerable to theft, including uses that could generate revenue streams to support maintenance of the street lighting network. The most promising of these is the installation of fiber-optic cables or other communications cabling, which does not have the same "street value" or ease of resale as easily-recyclable copper wire. Many different activities and services – both public and private – require communications connections that could make use of the type of conduit space and right-of-way access that the existing electrical conduit infrastructure provides.

Beyond revenue potential, the repurposing of electrical conduit for fiber connectivity can also contribute to a safer, more resilient, and more economically prosperous City. Although the digital divide has been closing somewhat in recent years since the pandemic, there are still areas of the City with high numbers of under-connected households. Additionally, even in places that are now technically "connected" according to current standards, advancements in connected technology are happening so rapidly that what may work today may not be "future-proofed" for a world where telehealth and autonomous vehicles are commonplace. At the same time, high-speed connectivity is increasingly important for the delivery of City services, especially in the public right-of-way where the existing street lighting conduit is located – and particularly as the City prepares for major events. Whatever the application, the defining factor in connectivity capacity is the availability of backbone fiber, which can be very expensive and difficult to install without existing conduit infrastructure.

The sections below provide an initial assessment of the potential for such repurposing, including preliminary estimates of the scale of repurposeable conduit, the costs for assessing and readying conduit segments for re-use, and possible applications and lease rates based on consultant recommendations and discussions with BSL partners. Overall, it is the Bureau's current assessment that vacated electrical conduit from solar-to-battery conversions is a highly valuable resource that should be put to use for the benefit of the people and communities of Los Angeles.

Table 1: Key Numbers (Approximate)

	<b>Solar-Conversion-Suitable Street Lights*</b>	<b>Repurposeable Conduit After Conversion</b>	<b>Conceptual Annual Lease Revenue (At 85% uptake)**</b>
Already Solar-Converted To Date	1,402	34 miles	\$381,480
Citywide Potential	60,000	1,700 Miles	\$19.0M
In Wire-Theft Hot-Spots	16,000	460 Miles	\$5.2M
In Low Fiber-Availability Areas	9,500	270 Miles	\$3.0M

\*Based on street light pole type and location; does not account for pole condition or micro-local factors such as shade

\*\*Assumed revenue per leased mile: \$13,200

Other Key Numbers in Report:

Contracted cost to the Bureau to install new 1” steel conduit: \$45-55 per linear foot

Solar street light purchase, preparation, and installation cost: Approximately \$6,500 per fixture

Inspection and refurbishment cost per circuit (~16 lights): \$11,200 avg., up to \$30,000

**SECTION I: Scale and Geography of Potentially-Repurposeable Conduit**

**Conduit Specifications**

In almost all cases, BSL’s existing underground electrical conduit is 1” or 1.5” diameter steel conduit. Unlike indoor conduit applications, the conduit has no 90-degree turns, with sweeping curves into existing pull-boxes (most often about one box per three poles) or around at corners. It is the Bureau’s assessment, based on our own growing fiber operations, that most of the electrical conduit network would accommodate fiber optic cables as designed and installed. With contemporary fiber cable production methods, 1 inch conduit can hold hundreds of individual strands of fiber, depending on the specifications and application.

**Estimating the Universe of Potentially-Repurposeable Conduit**

For the purposes of this report, an in-depth analysis was conducted on the existing street lighting conduit network to determine the scale and geography of the potential universe of solar converted circuits.

First, each individual pole type was given an initial assessment of solar-conversion-suitability, based on the Bureau’s solar conversion experience to date. Generally speaking, decorative and historic pole types, as well as poles with multiple arms, are not suitable for conversion. For this report, only pole types that had already been converted in the field or that were functionally

comparable to such poles were considered suitable for conversion. As such, the scale of potential conversion-suitable poles is inherently conservative (it is likely that many other pole types could be possible for conversion). Additionally, only poles that were located along local or collector streets were considered suitable for conversion, as current solar-to-battery fixtures do not meet BSL standards for major streets. Lastly, poles with co-located telecommunications equipment were not identified as suitable for conversion.

Once the potentially conversion-suitable poles were identified and mapped to the conduit network, the designs of individual circuits (groups of lights connected to the grid at a single LADWP “service point”) were assessed to determine the sections that could theoretically be removed from power. Some circuits contain only conversion-suitable poles, while others are a mix of both suitable and unsuitable poles. For these “mixed” circuits, a conservative data-driven best-effort was made to determine how many feet of conduit connected to suitable poles could be removed from service while maintaining a functioning circuit for the unsuitable poles.

This “desk-based” process provides a good estimate for the location and scale of the solar-conversion potential of the network, but it is in no way comprehensive. As noted above, specific local conditions like extensive tree cover could make conversion impossible. Only an on-site inspection could determine the true solar-conversion potential of a given location. Understanding this, this report uses conservative estimates for conversion (approximately 50% on mixed circuits) and aggregates data to the block group level. Segment-by-segment conduit mapping has been completed and is available for discussion but is not included in this report due to the danger of encouraging more wire theft by making conduit locations more available.

This report does not estimate the condition of the existing conduit. In many cases, decades-old conduit has been intruded by roots or broken by other construction. A process has been developed by the Bureau to inspect and evaluate conduit for re-use, with a cost of approximately \$2,500-\$5,000 per circuit (average of 15 lights) to complete. Costs for repairing and readying conduit for re-use have also been estimated, though these vary widely from just a few thousand dollars to over \$30,000 for heavy repairs. As a per-pole estimate, this report assumes an average of \$700 for combined inspection and refurbishment. The data in this report also assumes that approximately 10% of total conduit feet would be cost-prohibitive for reuse, though this has not yet been verified by field checks.

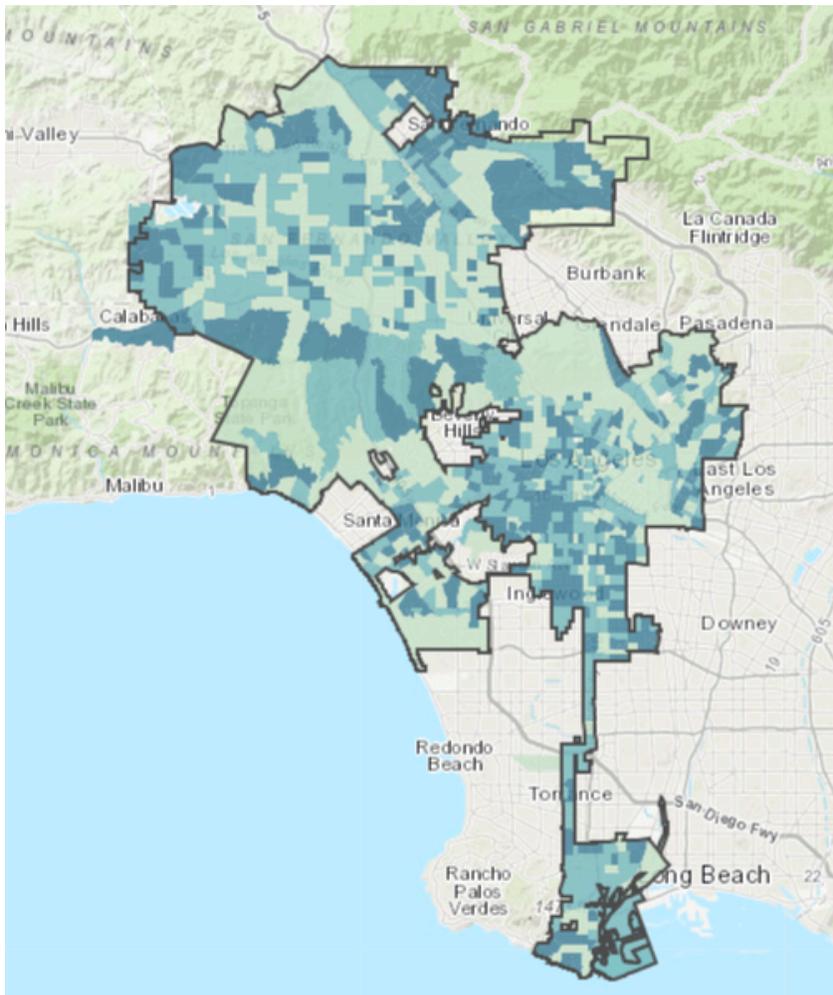
Despite the above limitations and caveats, it is the Bureau’s estimate that **approximately one quarter of the existing conduit-feet in the City’s network is ultimately suitable for solar conversion. In areas with few historic poles, a majority of conduit within residential blocks can be assumed to be suitable, pending inspection.** The following table outlines the estimated total feet of solar-convertible conduit per Council District, with an additional total for feet within copper wire theft “hot spots” (see Addendum Map A1). The subsequent map gives a sense of the geography of solar-convertible conduit by depicting census tracts with large shares of conduit that are potentially solar-convertible. Notable communities include Hyde Park, Watts, Mid-City, Panorama City, Sunland-Tujunga, and Canoga Park.

**Table 2: Estimated Linear Feet of Conduit Within Solar-Conversion Suitable Conduit Segments**

Council District	Total Estimated Solar-Conversion Suitable	In Wire-Theft Hot Spots
1	242,355	76,834
2	217,887	15,422
3	695,372	74,047
4	456,199	78,065
5	523,940	291,672
6	644,440	268,931
7	657,615	336,596
8	871,515	233,102
9	567,140	99,777
10	747,042	244,891
11	668,194	63,779
12	1,297,658	351,869
13	422,001	135,806
14	500,354	132,622
15	737,647	56,761
Citywide	9,249,359	2,460,175

Map 1: Percentage of Conduit That is Potentially Solar-Convertible

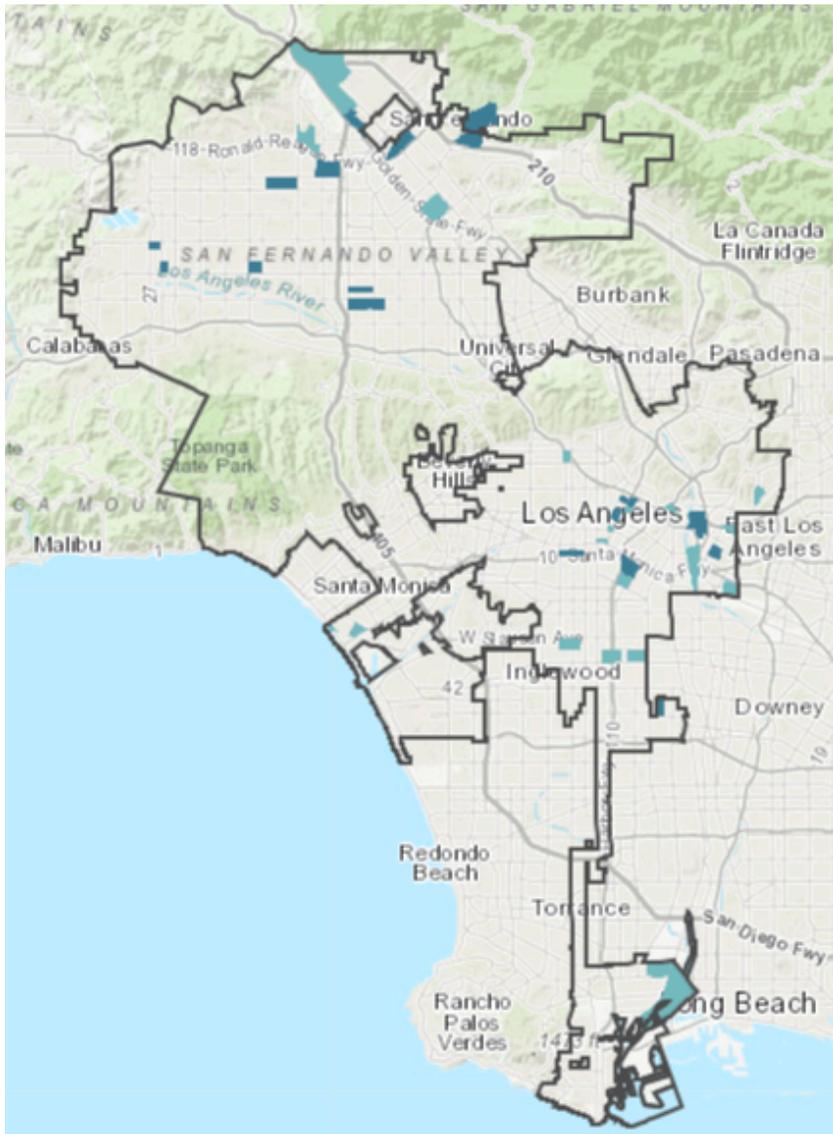
Dark Shading = 66% or more



**Solar Conversions To Date**

As of the writing of this report, 1,402 BSL street lights have been converted to solar-to-battery operation since FY23/24. The associated conduit that could potentially be repurposed due to these conversions totals approximately 34 miles. The map below shows the approximate geographic locations of these conduits by census block group. Note: many of the solar-to-battery conversions have been undertaken along bike paths which extend linearly for multiple miles but do not show up well on a map aggregated by census geographies.

Map 2: Approximate Concentrations of Conduit on Solar Converted-Segments



**Key Opportunity: Orange Line Conduit Repurposing**

The State’s Middle-Mile Broadband Initiative (MMBI) is currently building out a historic statewide open-access public fiber network which will transform the way the internet works in California – essentially building internet “highways” between internet exchange points (IXPs) that will reduce the barriers of entry for new ISPs and for new types of services along the interconnecting routes. Although left out of initial plans for the network, a coalition of local electeds and advocates pushed for the inclusion of a route along the 110 freeway in South LA, which the Bureau is now building in partnership with the State. Another one of the key under-connected regions of Los Angeles that was left out of the network is the Canoga Ave corridor between Canoga Park and Chatsworth, roughly along the alignment of the Metro G Line busway route.

The absence of this route creates a very visible “gap” in the state network, with a route along the 101 ending abruptly at Reseda (best practices for fiber networks dictate building “loops” to create redundancies and alternative pathways for data to travel). However, recent solar conversions along the G Line may present an opportunity to address this gap.

The Bureau has already converted approximately 4 miles of the street light route along the G Line Bike Path to solar-to-battery fixtures, and Metro is currently in the process of converting an additional roughly 2 miles. When complete later this year, there will be an almost-contiguous line of vacated electrical conduit between the Reseda Station and the Nordhoff Station. If additional solar conversions can be made along the 1-mile segment from Nordhoff to Chatsworth, this combined work would create a potential empty conduit route with both endpoints within 1 mile of the MMBI. With relatively limited new-build construction, this route could be repurposed to create a conduit path for a fiber line that would significantly improve the operational efficiency and resiliency of the MMBI network while bringing its benefits to one of the most disconnected corridors in the City.

In 2024 the Bureau commissioned LAEDC to complete a report on the economic impact of the digital divide in Los Angeles<sup>1</sup>. This report created a Digital Distress Index (DDI) and used this index to identify target areas for City WiFi projects – one of which was the West San Fernando Valley corridor along Canoga Ave. This finding was one of the key justifications for the Bureau’s Canoga Park Community Connectivity Pilot, which is in final construction and expected to begin initial public WiFi service within the quarter. Connecting this project and other future public and private initiatives to the state Middle Mile would expand internet options for residents and ensure the area can participate in future State broadband initiatives.

The Bureau has had an initial discussion with the State around the opportunity to retrofit the existing conduit for fiber use and extend it to meet the MMBI. The State is very interested in exploring the viability of such a project, however this interest is dependent on the project being completed before the end of the calendar year. In a similar partnership to the 110 MMBI route that the Bureau is currently constructing in partnership with the State, the proposed concept in discussion would have the State provide the funding for the project, with the Bureau handling retrofit work and any new construction within the City’s Right-of-Way, with some fiber capacity retained for City operations. While BSL is confident that such a project could be completed within the necessary timeframe, it would require significant intra-jurisdictional collaboration.

Because the existing conduit is within Metro Right-of-Way, such a project would need approval from Metro, which would need to realize some benefit for their operations from the project as well (the Bureau has had only very preliminary discussions with Metro about such a project). With only one-inch conduit in place to repurpose, it is unclear that capacity could be effectively

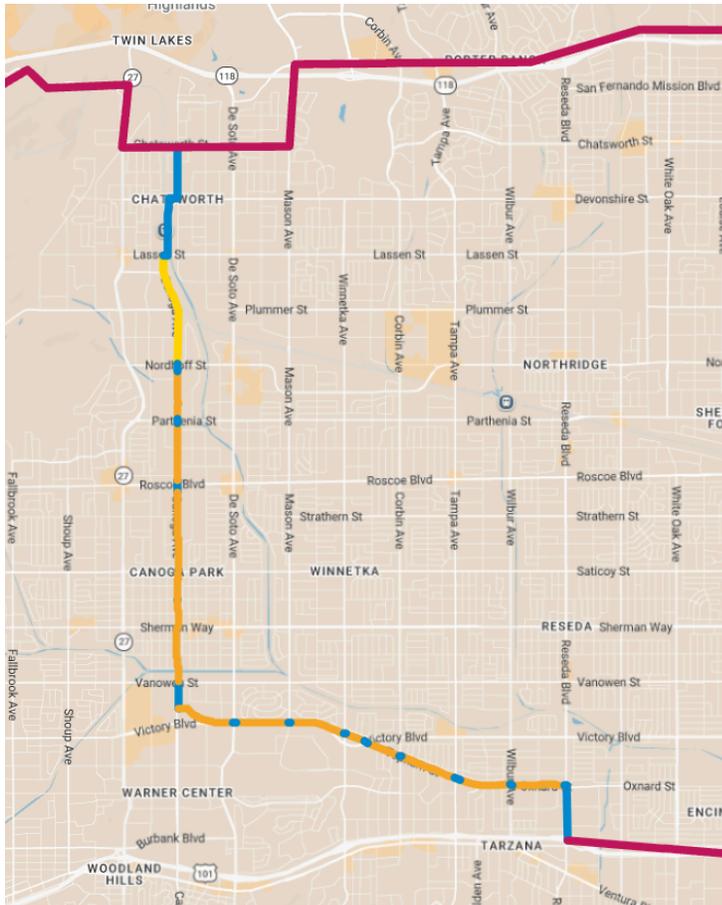
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<sup>1</sup> “Addressing the Digital Divide in the City of Los Angeles,” March 2024, Los Angeles County Economic Development Corporation Institute for Applied Economics.  
[laedc.org/download/addressing-the-digital-divide-in-the-city-of-los-angeles](https://laedc.org/download/addressing-the-digital-divide-in-the-city-of-los-angeles)

segmented for all three parties (State, Metro, BSL). However, the Bureau is continuing to explore this opportunity given the significant potential benefit to the residents of the West Valley.

Map 3: Potential MMBI West Valley Route

- Existing: **Dark Red** = State MMBI Network
- Orange** = Existing Solar-Converted Segments (6 Miles)
- Conceptual: **Blue** = New Build Conduit (2.3 Miles)
- Yellow** = New Solar-Converted Segment (1 Mile)



**SECTION II: Potential Leasing and Re-use Opportunities**

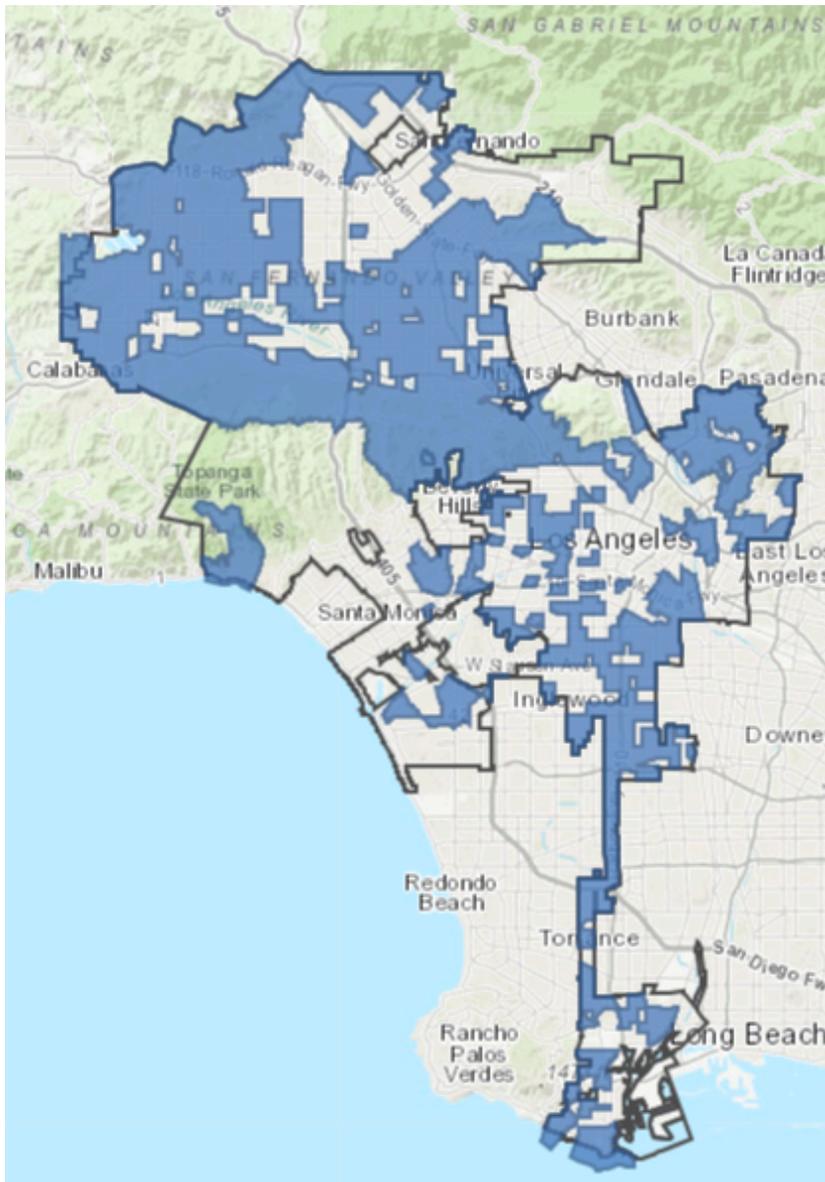
**Initial Market Findings**

The leasing of existing vacated electrical conduit for fiber-optics installation is a well-established practice, with such well-known examples as New York City's Empire City Subway, an underground conduit and manhole system established in 1891 for electricity and communications lines which now houses backbone fiber lines to serve the City. However, leasing rates for such operations are not easily available and so the Bureau has used other available information to estimate the leasing potential.

In 2024, the Bureau contracted with HR&A Advisors to conduct an assets and infrastructure assessment for a new fiber conduit construction program for the Bureau. This work included a per-mile leasing revenue estimate for HDPE conduit innerduct (comparable in capacity to 1” steel conduit) of approximately \$20,000, or about \$3.75 per linear foot, with an 85% expected uptake with a managed service provider to handle leases. Given the fact that the existing steel conduit was not initially designed for fiber and because deterioration and other challenges may be present due to the age of the conduit, this report assumes only  $\frac{2}{3}$  of that estimated revenue per linear foot or mile – or \$2.50 per linear foot.

Based on initial conversations with subject-matter expert partners and potential lessees, the areas where market interest in leasing vacated electrical conduit from the Bureau is expected to be highest is those with limited existing fiber service. This is expected to be especially true for parts of the city that have undergrounded utilities and so do not have aerial utility poles which are commonly used for co-location of fiber infrastructure by multiple internet service providers (one of the most notable such areas is the West Valley). The Bureau has used FCC Broadband Serviceable Location (BSL) data to identify areas of the City that have high numbers of addresses with no available fiber service, and is using this as a proxy for higher-demand communities. The map below shows the geographic location of these areas.

Map 3: Census Tracts With 300+ Addresses Un-Served by Fiber

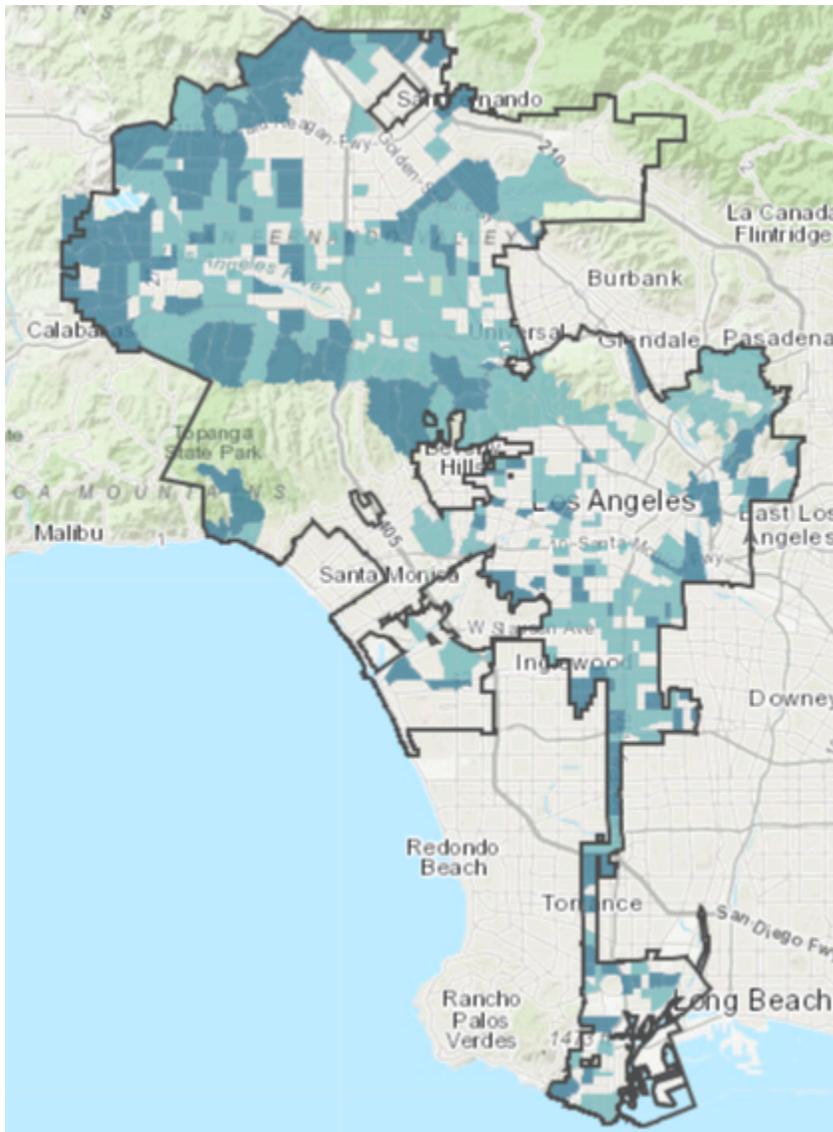


The table below cross-references locations with high concentrations of potential solar-convertible conduit and areas with low-fiber availability to estimate the low-hanging fruit market potential per Council District. This is followed by a map that depicts these key areas. Notable communities include Canoga Park, Chatsworth, Porter Ranch, Panorama City, Hyde Park, Harbor Gateway, and Wilmington.

**Table 2: Estimated Linear Feet of Conduit Within Solar-Conversion Suitable Conduit Segments Within Low-Fiber Availability Census Tracts (As Defined by FCC Data)**

Council District	Total Solar-Conversion Suitable	Estimated Potential Annual Revenue
1	41,401	\$87,977
2	14,579	\$30,981
3	74,047	\$157,351
4	46,007	\$97,765
5	146,304	\$310,896
6	167,114	\$355,118
7	92,016	\$195,535
8	158,680	\$337,195
9	84,941	\$180,500
10	59,430	\$126,288
11	28,426	\$60,405
12	343,542	\$730,028
13	14,235	\$30,250
14	101,568	\$215,831
15	56,761	\$120,616
<b>Grand Total</b>	<b>1,429,053</b>	<b>\$3,036,737</b>

Map 5: Low-Fiber Areas With Highest Concentration of Solar-Convertible Conduit



**Potential For Lease Revenue to Support Solar Installations/Maintenance**

As mentioned above, solar-to-battery installations are relatively expensive and cost is one of the main factors limiting the expansion of conversions. By pairing conversions with conduit leases there is the potential to offset some of these costs, with the scale of the offset dependent on the ratio between the number of poles to the feet of conduit. Each solar conversion costs approximately \$6,500, plus the additional \$700 for conduit inspection and refurbishment to prepare the conduit for repurposing, for a total of \$7,200. On average, there is approximately 150 feet of conduit on a circuit per pole, meaning leases would generate \$375 per year at the assumed \$2.50 per-foot lease revenue. Over the 10 year life of a solar-to-battery fixture, this would generate \$3,750, or roughly half of the total conversion cost. For circuits with more

conduit feet per light, there is greater offset potential (the inverse being true for those with less feet per light).

### **Key Opportunity: Destination Crenshaw FFA-Funded Project**

In 2025, the Bureau launched an ARPA-Funded Community Connectivity pilot project along the Crenshaw Corridor in partnership with Destination Crenshaw. This pilot project included the installation of roughly 2 miles of 3” underground fiber conduit “backbone” infrastructure, currently being used to provide free wifi along the corridor via pole-mounted equipment installed in partnership with Cisco. Also In 2025, Destination Crenshaw received a \$25M Federal Funding Account (FFA) grant from the State of California to build off the Community Connectivity Pilot infrastructure into surrounding areas. Most significantly, this project will include fiber-to-the-home internet connectivity, the most resilient and future-proofed connectivity typology.

As part of the Bureau’s discussions with Destination Crenshaw around this forthcoming project, the partners are currently working to evaluate the potential for using solar-conversion-vacated conduit, should poles in the area be converted to solar operation beforehand or simultaneously. Given the location of the current electrical conduit in the sidewalk immediately in front of homes/parcels, the conversion to fiber-to-the-home operations could prove suitable and could reduce the need for new construction impacts on these residential neighborhoods. If so, there may be an opportunity with this project to significantly off-set the costs of simultaneously bringing solar lighting to a community which has long been impacted by copper wire theft.

### **Additional Needs to Maximize Leasing Operations**

The above potential leasing opportunities are dependent on the Bureau’s capacity and ability to effectively assess, track, market, and manage conduit for lease. While the Bureau is confident in its capacity to initiate a handful of pilot leases over the next year, the full potential of this concept (and revenue numbers approaching those listed above) cannot be realized without a professional contracted managed service provider (MSP) that can undertake leasing activities on behalf of the Bureau. Many different models for MSPs exist, as laid out in the Infrastructure and Assets Report that the Bureau commissioned from HR&A in 2024, and the Bureau has begun some early discussions with subject matter experts around what possible partnerships could look like for the Bureau’s purpose-built fiber conduit. Ultimately, the Bureau will need to identify seed funding to contract with an MSP and to start up a dedicated operation to prepare conduit for leasing.

Additionally, in some of the Bureau’s discussions with potential private-sector lessees, a framework wherein lease fees are reduced in exchange for “lit” fiber service for City purposes was raised. This is a common framework for many municipal conduit leasing operations and could be valuable to the City for some applications as a way to reduce IT overhead costs. An MSP could manage such a framework alongside other revenue models.

### **Other Re-Use Opportunities**

Given the susceptibility of electrical wire to theft, this report does not thoroughly examine repurposing of conduit for other electrical purposes such as electric vehicle charging. However, with additional fortifications and proactive tagging of wire, it may be possible to establish a specialized circuit for a charging location that is less susceptible to theft and possibly even providing improved charging. The Bureau is committed to exploring such options as the EV charger Program is a driving force for equitable EV adoption and ubiquitous transportation electrification, with 276,408 charging sessions in fiscal year 24/25 alone. Sensors, cameras, IoT and edge technology deployments must also be examined and depending on situation, may require traditional electrical systems or be possible to run on additional solar generation. The Bureau's Co-Location Program, established in 2017, has offset significant infrastructure investments in new poles and foundations and would be a model for such operations.

Additionally, although the focus of this report is on third party leasing opportunities, the Bureau also suggests there may be significant opportunity to re-use vacated electrical conduit for City purposes. However, these purposes have not yet been discussed in detail with other City Departments and so cannot be included in this report at this time. It may be helpful to partner with the Office of the City Administrator to identify and initiate interdepartmental discussions.

What the Bureau can confidently assume, though, is that other departments face similar costs for the installation of new underground conduit (\$45-\$55 per linear foot, or about \$240,000-\$290,000 per mile). Based on the assumptions and findings laid out in the report above, the cost to convert a circuit to solar-to-battery operations and to prepare the conduit for new purposes is essentially the same at about \$48 per linear foot or \$250,000 per mile (this is based on \$6,500 per-pole conversion plus an additional \$700 per light for conduit preparation). What this presents is an opportunity to bring additional value to communities (solar lighting) while providing conduit for City purposes.

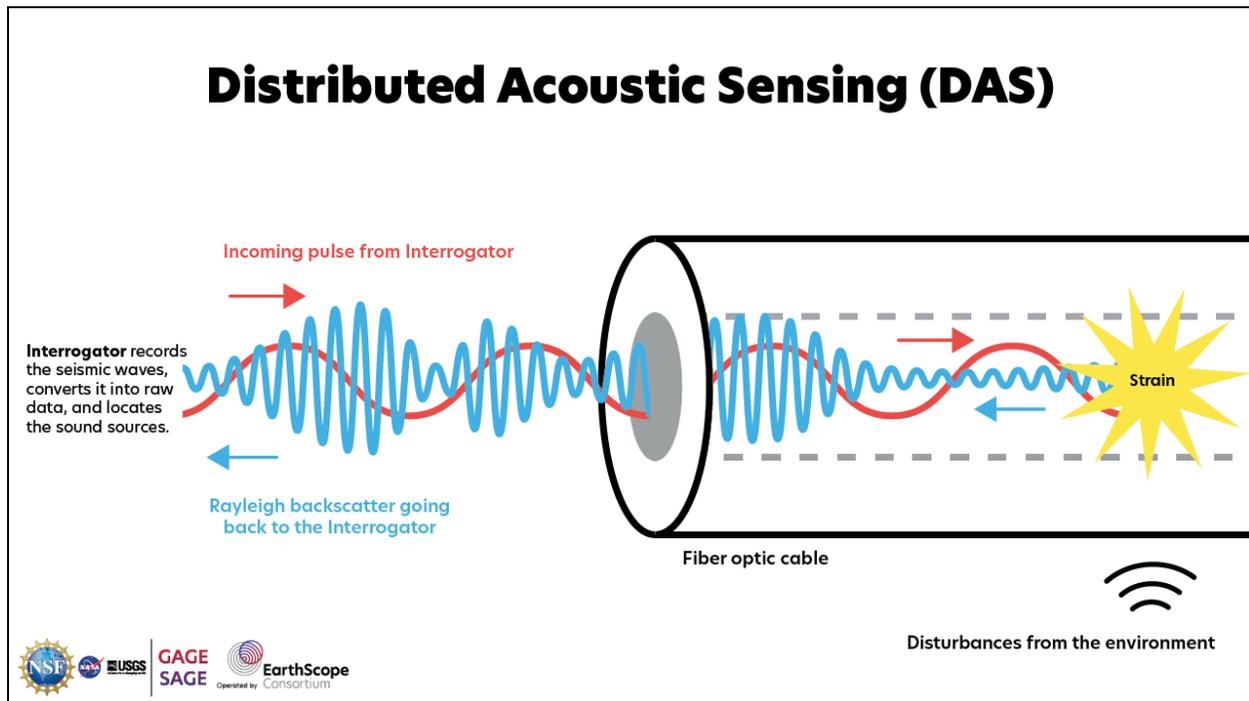
### **Key Opportunity: Distributed Acoustic Sensing (DAS)**

Fiber optic cables transmit data through pulses of light sent along glass fiber strands. Due to normal imperfections and bends in the fiber route, a small amount of that light is scattered and returns back to the sending point. Vibrations in the earth near the cables, both large and small, can temporarily change how much of the light is scattered back. By attaching ultra-sensitive equipment to fiber-optics networks, these vibrations can be recorded, profiled, and tracked to determine what is happening along the fiber cable – everything from earthquakes to the footsteps of deer. This technology, known as Distributed Acoustic Sensing (DAS) was originally developed in the 1990s for petroleum industry operations, but has since expanded to many different applications such as transportation management, environmental sciences, and asset monitoring. The past few years has seen an especially large increase in interest and applications due to improvements in the sensing technology.

Among the most significant potential applications of DAS is for seismic sensing and early detection, with Cal State Humboldt leading much of the research in this field. Through a

partnership with USGS and regional fiber networks, Cal State Humboldt researchers have established a roughly 40-mile system that has already captured information from many earthquakes and is helping researchers and policymakers learn new insights about how seismic events unfold. The Bureau recently met with a researcher from Cal State Humboldt to begin an exploration of whether our existing electrical conduit could potentially be put to use for such a purpose in Los Angeles. Standing up a Bureau pilot would likely be relatively inexpensive, given that the Bureau has already established a fiber network hub and data center in the sub-basement of the Public Works Building.

There is local precedent for this type of effort. In November 2019, the California Institute of Technology (Caltech) and the City of Pasadena cooperated to turn two strands of unused telecommunication fiber cables into a city-wide DAS array. In an associated research project, the DAS array was used to record changes in traffic volumes and patterns in Pasadena due to the impacts of COVID-19 and related policy responses.



DAS Diagram from Earthscope.org

**FISCAL IMPACT**

This report is information-only about existing programs and projects; there is no fiscal impact.

**RECOMMENDATIONS:**

This report is provided as information-only.

Respectfully submitted,



Miguel Sangalang, Executive Director  
Bureau of Street Lighting

**ADDENDUM**

Map A1: Copper Wire-Theft “Hot Spot” Map Based on Volume and Recurrence of Requests, 2023 to Date

