



Fiber Optics Enterprise and Fiber Expansion Strategy

Power System Advanced Technologies Infrastructure

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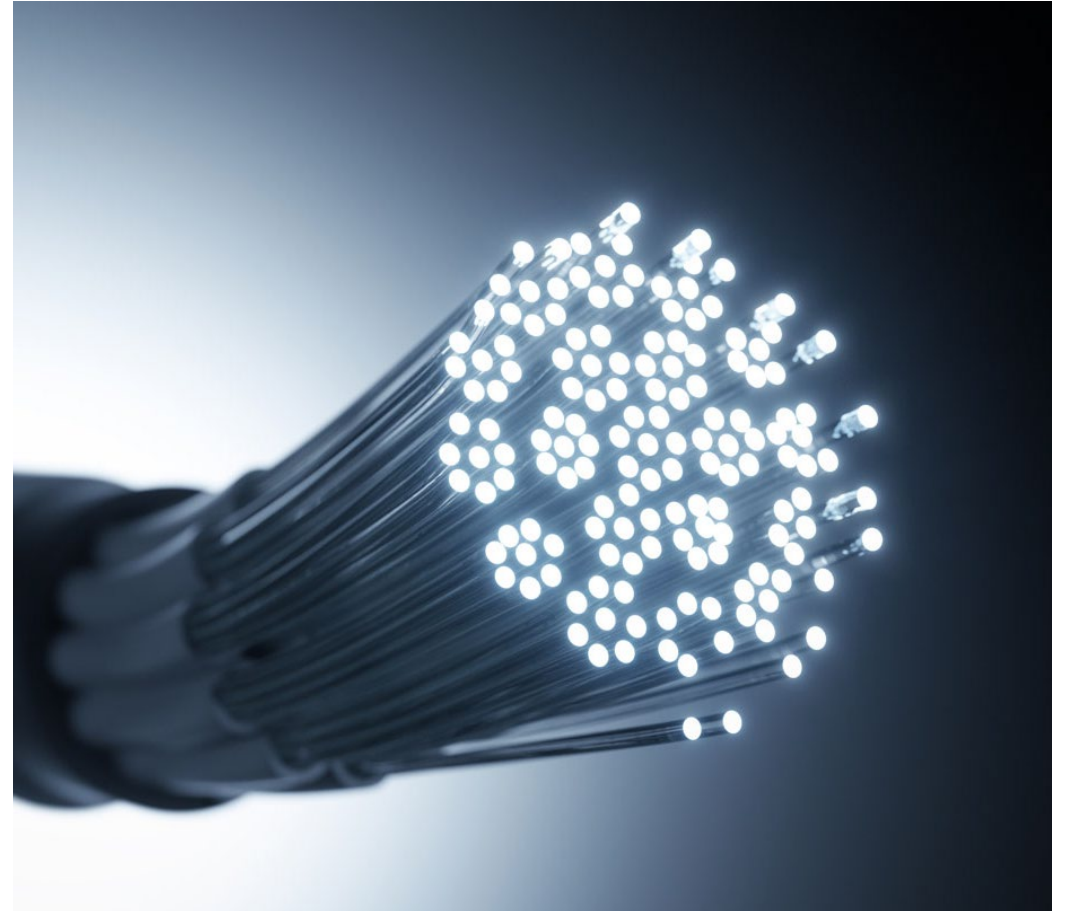
August 13, 2024

Agenda

- Background
- Mission
- What is Fiber
- Commercial Fiber Business
- Fiber Expansion Strategy
- Benefits of Fiber Expansion

Fiber Optic Enterprise - Background

- Fiber Optic Enterprise (FOE) is a section of DWP's Power System, **Advanced Technologies Infrastructure Division**.
- Established in the early 1990s to build out fiber as a replacement to copper cables
- Engineering, Drafting, Administrative, and Field personnel support FOE business operations.
- Leverages utility assets and ROWs to enable state-of-the-art telecommunication services for businesses, agencies, and citizens in the City of Los Angeles.



Primary Mission

- Provide state of the art, wide area data transport network to support DWP's core business needs:
 - Corporate and SCADA connectivity to Power and Water facilities
 - Connectivity to Data centers
 - Security Services
 - Substation Automation
- Provide robust and redundant high-speed network connectivity to maintain the reliability of DWP services and support major DWP Initiatives including:
 - Distribution Automation Project (DA)
 - Distributed Energy Management Resources (DERMS)
 - Electric Vehicle Charging Stations
 - Grid modernization



Secondary Missions

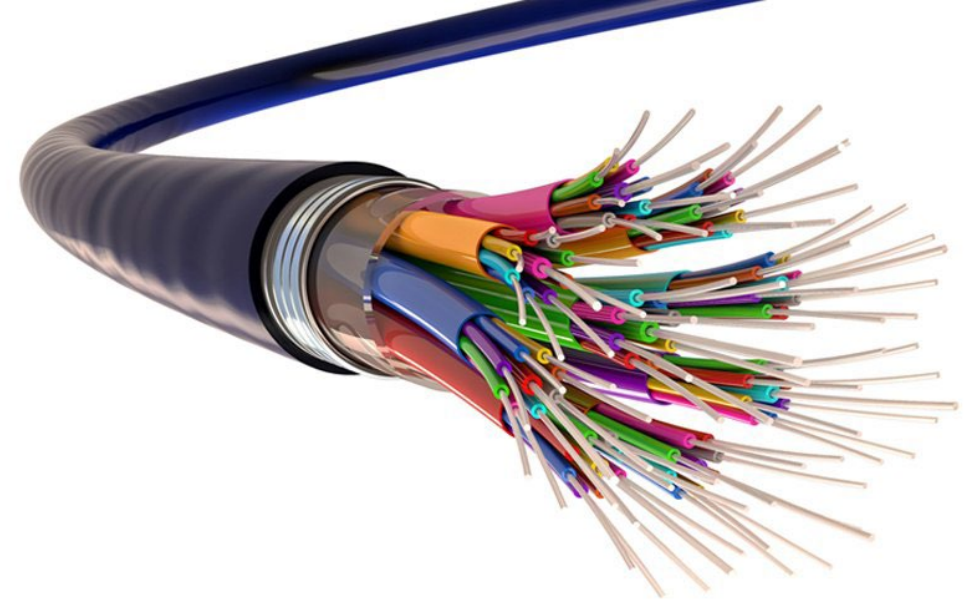
- Generate revenue from fiber optic capacity currently not being used for the Primary Mission by making it available to:
 - City Agencies
 - Businesses
 - Educational Users
- Promote economic development for Los Angeles by increasing competition for bandwidth and data transport services in the city.





What is fiber?

- Fiber optic cable contains fiber strands made of glass. These strands transport data in the form of light.
- FOE deploys fiber optic cable with up to 432 strands.
- FOE installs fiber on DWP assets and in DWP rights-of-way.
- Advantages of having DWP fiber:
 - Reliable
 - High speed
 - Cost avoidance: FOE fiber provides \$10M in annual cost avoidance for the Department's internal network infrastructure



Dark vs. Lit Fiber

LADWP provides two product Offerings: Dark and Lit Fiber

Dark Fiber

- Dark fiber refers to the cable that is installed and ready to use.
- Dark Fiber circuits are handed over to various customers that install and manage their own equipment on each end.

Lit Fiber

- "Lighting up" fiber requires the installation and use of network equipment.
- LADWP also provides Bandwidth Transport services from 10 MBps to 100Gbps.

Commercial Fiber Business

- FOE leases dark fibers that are not presently needed for DWP.
- FOE also offers Bandwidth Transport Services (aka Lit Services), starting at a bandwidth of 100Mbps.
- The revenue is deposited into DWP's Power Revenue Fund.
- FOE has about 75 active lease agreements with 33 commercial customers.
- We do NOT lease to individual residences or provide internet services.
- Typical contracts have terms of 1-5 years.
- FOE lease agreements undergo the GM or Board approval process.





Commercial Fiber Business

- Leasing excess dark fibers does not add significant cost to operations and maintenance as the Department leases small percentage of capacity.
- The revenue generated from the leases helps cover the cost of maintenance and operations of the overall fiber network.

Fiber Optic Expansion Strategy - Background



FOE will seek professional services to evaluate the current fiber network and create a strategy for the purpose of expanding the DWP fiber network within the City of Los Angeles.

The purpose of the expansion is to meet the needs of DWP's Informational and Operational Technology Infrastructure, while avoiding commercial network service provider costs to DWP and City of LA.

Fiber Optics Expansion Strategy - Objectives

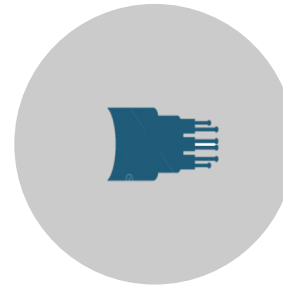
- The expansion strategy will include:
 - Dark fiber design recommendations.
 - Communication transport services (lit service) evaluations.
 - Fiber back haul technologies recommendations.
 - Recommendations for a Commercial Off the Shelf Industry Standard Operation Support System (OSS).
 - Conduct a price survey to ensure our prices are competitive and fair.
 - Evaluate maintenance and operations costs and how to include in the pricing .

Fiber Optics Expansion Strategy – Strategy Plan



Needs Assessment:

Evaluate the needs of the Department and the City.



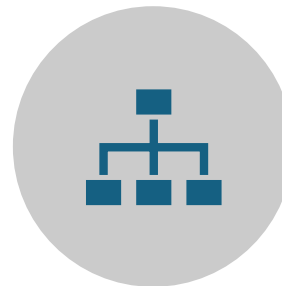
Fiber Design:

Develop a design that incorporates existing infrastructure and proposes new facilities and location in the City. Design for robust network reliability and redundancy. Get DWP ready for the future.



Infrastructure Evaluation:

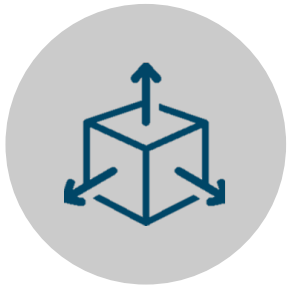
Evaluate existing infrastructure to determine if modifications are needed to accommodate an expansion.



Implementation Plan:

Develop plan that identifies resources and material the Department can use expand its fiber network.

Fiber Optics Expansion Strategy – Strategy Plan



Scalability and Futureproofing:

Ensure plan allows for scalability.



Security and Redundancy:

Appropriate security measures to protect the infrastructure from potential threats. Design redundant routes to critical locations to minimize downtime.



Best Practice:

Consider industry best practices.



Management and Documentation

Solutions: Evaluate options that can be incorporated into the existing solutions used.

Fiber Optics Expansion Strategy – Benefits

- ✓ Evaluation will provide a cost benefit analysis to determine the financial viability of the expansion strategy.
- ✓ Reduce the need for third-party providers for LADWP.
- ✓ Provide additional revenue from potential of leasing excess fiber capacity to utilize to further expand and maintain the network.
- ✓ Ensure lease pricing includes any O&M that is applicable.
- ✓ Reach more LADWP and City locations.



Questions and Comments