**Transitioning Fluorescents to LEDs**

LBNL’s market analysis on commercial fluorescent lighting has shown that manufacturers are producing fewer fluorescent lighting products and with lower efficacies. On the other hand, LEDs are rising in availability and popularity with lower maintenance requirements, higher efficacies, and more environmental benefits. Below are various options for phasing out of using fluorescents.

**Delamping**

Consider opportunities for delamping to reduce over-illumination, save energy, and increase occupant comfort. Delamping opportunities are subject to ballast type which can affect the compatibility of fixtures to operate with fewer lamps.

**Retrofitting**

Another option is retrofitting your old, less-efficient lighting fixtures to LED fixtures which are proven to save energy and are more cost-effective in the long run. A full fixture retrofit involves disconnecting wiring and removing the existing fluorescent fixture from the ceiling and replacing it with a new LED fixture. LED retrofit kits are also available; these involve replacing the lighting components in an existing fluorescent fixture (lamps, ballasts, covers, and reflectors) with an integrated LED light source, electronics, and optical assembly that fits into the existing fixture, while leaving the fixture chassis in the ceiling.

**Spot Replacements**

If full retrofits aren’t an option at your site, consider doing spot replacements; replacing your older fixtures with LED fixtures as they fail. This option may result in a less uniform appearance for the lighting system.

**Types of LED Replacements**

*Note: The replacement options discussed below can also apply to outdoor lighting, like considering transitioning from HIDs to LEDs.*

Another way to transition to LEDs at your site is by keeping existing fluorescent fixtures but replacing your T8 fluorescent lamps with LED retrofit lamps, known as linear LED replacement lamps, tubular LED lamps, or “T-LEDs”. This type of LED typically connects to the fluorescent fixture mechanically and electrically via the existing pin-based fluorescent lamp sockets. There are three LED replacement lamp options for fluorescents and it’s important to know which type is being installed before performing maintenance.

Easiest Installation: *Type A - LED tube with integrated driver*

This type of LED tube lamp is a direct fit or “plug-and-play” option. It operates with the existing linear fluorescent ballast power and lamp sockets and provides the retrofit option with the lowest labor requirement. However, fixtures are still subject to ballast maintenance issues going forward (if the ballast fails it must be replaced for the lamps to operate). The installer must also ensure that the ballast and LED replacement lamp are compatible.

Simplest Total System: *Type B - Ballast bypass LED tube*

This type of LED tube lamp requires rewiring the fixture to bypass the fluorescent ballast. The LED tube operates on line voltage and includes an internal driver; this option involves more intensive installation requirements with electrical modifications needed.

*Note: There are products that are “dual mode” type A and type B); these are compatible with existing fluorescent ballasts and can also operate on line voltage if the fluorescent ballast has been bypassed.*

Recommended: *Type C - LED tube with remote driver*

For this LED replacement lamp, the fluorescent ballast is removed and replaced with an LED driver for better system efficacy, compatibility, and overall performance. This system involves higher upfront cost and labor but provides better long term energy savings and system efficiency.

Source: [BOMA Dallas White Paper: The ABCs of LED Tubes (UL Type)](https://www.bomadallas.org/files/White%20Papers/ABC%27s%20of%20LED%20Tubes%20-%20FSG.pdf)

**Cut-and-Paste Acquisition Language for Lighting Maintenance [Service Solicitation]**

**Statement of Work [*Include in solicitation AND contract language*]**

The Contractor shall provide lighting products that meet design requirements and maximize energy savings. Any replacement equipment required in the operation and maintenance of the equipment shall meet [ENERGY STAR](https://www.energystar.gov/products/lighting_fans) or [FEMP-designated](https://www.energy.gov/eere/femp/search-energy-efficient-products) qualifications.

**Technical Specifications [*Include in solicitation AND contract language*]**

The Contractor shall supply lighting products that meet ENERGY STAR or FEMP-designated qualifications for all lamps, fixtures, and ballasts purchased under this contract.

To find ENERGY STAR ® certified lamps and fixtures, visit: <https://www.energystar.gov/productfinder/>

To find FEMP-designated lamps, fixtures, and ballasts, visit: <https://www.energy.gov/eere/femp/search-energy-efficient-products>

The Contractor shall track the number of operating hours for installed LED fixtures to ensure that Lamp Lumen Depreciation (LLD) does not hinder the LED performance; useful life is typically at 70% of initial lumen output. In addition, the Contractor shall clean LED lamps and fixtures on a regular maintenance cycle to reduce the effects of Luminaire Dirt Depreciation (LDD). The Contractor shall also perform regular cleaning on heat sinks to help with thermal management and prolong LED luminaire performance.

**Document Requirements [*Include in solicitation AND contract language*]**

The Contractor shall verify that all lighting products supplied under this contract meet or exceed DLC Premium or FEMP-designated qualifications. The Contractor shall submit manufacturer cut sheets that confirm the products comply with efficiency requirements for each model of the covered product supplied.

*Past Performance*

The Contractor shall provide documents showing prior experience in specifying, purchasing, and using DLC Premium or FEMP-designated products. The Contractor shall provide a list of all relevant contracts over the past two years involving the specification, purchase, and use of DLC Premium or FEMP-designated products.

If the Contractor intends to subcontract any work involving purchasing products, the Contractor shall provide documents showing the subcontractor’s prior experience with purchasing and using DLC Premium or FEMP-designated products.

**Evaluation Criteria**

[*Option 1*] *Technical Approach*

The Contractor will be evaluated on their ability to verify that all covered products they supply under this contract meet or exceed DLC Premium and/or FEMP-designated qualifications.

[*Option 2*] *Price*

The Contractor will be evaluated based on Best Value, including considerations for products purchased under this contract, as assessed through life cycle cost analysis. Contractors are required to provide the cost for each product using the life cycle cost formula below:

LCC = I + Repl − Res + E + W + OMR + X

where:

LCC = Total LCC in present-value dollars of a given alternative

I = Present-value investment costs

Repl = Present-value capital replacement costs

Res = Present-value residual value (resale value, scrap value, salvage value) less disposal costs

E = Present-value energy costs

W = Present-value water costs

OMR = Present-value non-fuel operating, maintenance, and repair costs

X = Present-value other costs (benefits treated as negative costs)

For more information on how to calculate life cycle cost, refer to <https://nvlpubs.nist.gov/nistpubs/hb/2020/NIST.HB.135-2020.pdf>

*Past Performance*

The Contractor will be awarded points based on evidence supplied of the Contractor’s past performance in providing energy-efficient products with contracts of similar size, scope, and complexity. Evidence will be evaluated based on the relevance of the submitted information, the level of detail, and verification from the Contractor’s references.

**Reporting** **[*Optional*]**

[*Insert in* ***Document Requirements*** *section*] The Contractor shall submit a sample Green Products Report. This report will serve as an example of the regular Green Products Report expected during the duration of the contract and should include the type of product supplied, quantity, dollar value, and type of green certification the product qualifies for, for all lighting products supplied.

[*Insert in* ***Evaluation Criteria*** *section*] Additional points shall be awarded to the Contractor able to provide a quarterly Green Products Report to [*your organization*] within 30 days of the end of every quarter the contract is valid for. The Green Products report must include all of the information specified in the **Document Requirements** section for all lighting products supplied.

[*\*Include in contract language*] The Contractor shall provide a quarterly Green Products Report to [*your organization*] within 30 days of the end of every quarter the contract is valid for. This report should include the type of product supplied, quantity, dollar value, and type of green certification the product qualifies for, for all lighting products supplied.

Reference: SF Tool Green Procurement Compilation - <https://sftool.gov/greenprocurement>