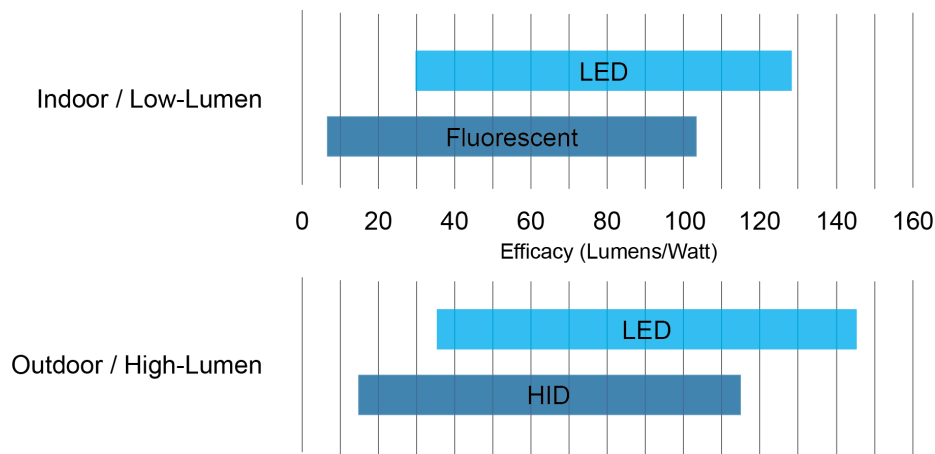


LED lighting efficiency is advancing rapidly, which can be challenging when predicting energy savings and specifying upgrades. This tech tip is intended to help energy auditors avoid insufficient light levels or over-predicted energy savings. Fixture efficacy is defined as usable lumens per watt, and a familiarity with the efficacy ranges for light fixtures currently available will help auditors make reasonable assumptions when comparing LED fixtures to traditional lighting technologies.

LED fixtures can be more efficient than comparable fluorescent and high intensity discharge (HID) fixtures. However, as shown in the following graphic, there is significant overlap in fixture efficacy: some fluorescent and HID fixtures are more efficient than some LED fixtures.

### Typical Efficacy Ranges for Different Fixture Types



When replacing fluorescent or HID fixtures with LEDs, if the efficacy of the existing fixtures is unknown, then **a wattage reduction of no more than 1/3 should be assumed.**

For example, for a generic 150W HID fixture, assume 100W for the LED upgrade.

This reduction is based on a comparison of LED, HID and fluorescent fixtures for a range of fixture types and wattage levels, and assumes that the existing light levels will be maintained.

If a wattage reduction greater than 1/3 is assumed, then the following should be provided:

Needed for Existing Fixture	Needed for Proposed Fixture
<ul style="list-style-type: none"> <li>Existing light output and how measured</li> <li>Existing wattage and how measured</li> <li>Make and model number of fixture, lamp, and ballast</li> </ul>	<p>Cut sheet with following information</p> <ul style="list-style-type: none"> <li>Model number</li> <li>Wattage</li> <li>Mean lumen output</li> </ul>

LED fixtures are more efficient in part because their directionality allows a higher percentage of the light to reach the intended surface. There is less of the wasted light that is characteristic of non-LED lighting types. This increase in illumination efficiency is built into the rated wattage and lumen output that are provided in LED fixture cut sheets and is accounted for in the 1/3 wattage reduction recommendation in this tech tip.

Energy auditors frequently overpredict energy savings from replacing fluorescent or HID with LED lighting by basing calculations on fixtures with significantly lower light output than the existing fixtures. If implemented as specified, insufficient light levels will typically be the result. Without evidence of significant over-lighting, reductions in light output should not be included as part of energy savings projections from LED retrofits.

### To find data about certified lighting products:

- Residential fixtures (LED and CFL) – ENERGY STAR Certified Light Fixture Product Finder: <http://j.mp/EstarFixtures>
- Screw-in bulb replacements (LED and CFL) – ENERGY STAR Certified Light Bulb Product Finder: <http://j.mp/EstarBulbs>
- Commercial fixtures and bulbs (LED Only) – Design Lights Consortium – Qualified Products List: <http://www.designlights.org/QPL/>