



## LEDs:

- Require minimal maintenance.
- Have a longer life span.
- Emit convective heat away from crops. Lights can be placed closer to the plant without burning or other damage.
- Can be tuned specifically for your crop needs.
- Do not contain mercury and lead, while HPS systems do, making eventual disposal easier.

# Controlled Environmental Agriculture

## GREEN PLANTS AND ENERGY

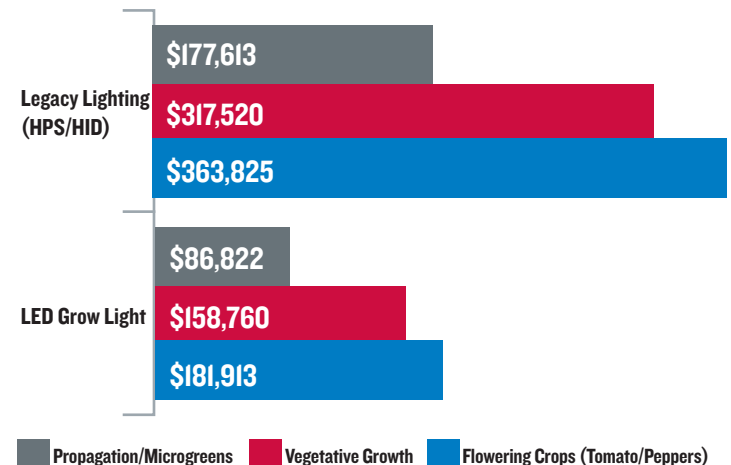
Major technological improvements over the past decade have transformed LED lighting, making it ideal for indoor agriculture. LEDs are now one of the best forms of lighting to ensure crop success and reduce energy use. Switching from high pressure sodium (HPS) lights to LED grow lights can help lower your energy use and save you money. Your energy-saving projects may even qualify for rebates.

## ENJOY THE BENEFITS

Efficient indoor agriculture lighting systems can mean lower electric bills and more energy savings for your business. LEDs cost less to run than the average HPS lighting system. Switching to an LED lighting system is better for your plants, your community and your bottomline.

## TOTAL ELECTRIC BILL

All costs are calculated at 9 years, which is the average lifespan of an LED grow light. The assumed average is based on the typical daily photoperiod lighting hours needed for a crop's growth stage.



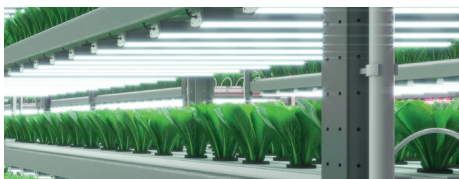
Note: Baselines are following IL Technical Reference Manual 4.1.11. Assumed baseline 1,000 W HPS and 600 W metal halide, assumed baseline for propagation 6 lamp T5 high output.



# Controlled Environmental Agriculture Lighting Guide

The Optimal Lighting Levels chart below provides insight into required photoperiods and light levels for different crop types and growth stages.

LED horticultural lighting fixtures not only cost less to operate than legacy technology, but can produce the appropriate PPF<sup>1</sup> levels plants need. LEDs fixtures can also produce PAR<sup>2</sup> photons with less input energy, making them significantly more efficient than HPS systems.



## Optimal Lighting Levels for Different Crop Types

	Propagation/Microgreens	Vegetative Growth	Flowering Crops (Tomatoes/Peppers)
<b>Optimal PPF levels (<math>\mu\text{mol}/\text{m}^2/\text{s}</math>)</b>	<b>100-300</b>	<b>400-600</b>	<b>120-350</b>
<b>Optimal Photoperiod (hrs/day)</b>	<b>18-24</b>	<b>16-24</b>	<b>12</b>

## CONTROLLED ENVIRONMENTAL AGRICULTURE TERMS

- Photosynthetic Photon Flux Density (PPFD<sup>1</sup>) measures the amount of PAR photons that plants receive within a given area of the canopy. Measured in  $\mu\text{mol}/\text{m}^2/\text{s}$
- Photosynthetically Active Radiation (PAR<sup>2</sup>) is the usable light, or photons, plants use for photosynthesis. PAR is measured in nanometers (nm), and ranges from 400 - 700 nm on the electromagnetic spectrum.
- Photosynthetic Photon Flux (PPF) is the amount of PAR photons a light fixture can create each second. Measured in  $\mu\text{mol}/\text{s}$
- Controlled Environment Agriculture Crops (CEA) are plants in the cannabis genus grown in an indoor environment with supplemental lighting, HVAC, dehumidification, and irrigation to propagate a fruiting body.

## CONTACT US

In addition to horticultural lighting, we are here to assist with your HVAC and dehumidification needs. We understand each facility is unique.

Visit [ComEd.com/Agriculture](https://www.comed.com/agriculture), to download the application or call us at **855-433-2700** to learn more.

Terms and conditions apply. Actual savings will vary by customer's energy usage and rate.  
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