

# LED Case Study





# Caterpillar, Inc.

Building H, Chillicothe, IL



## By The Numbers

Facility Size - 290,000 SF  
Project Size - 290,000 SF  
Installation Date - November 2023

### Existing Fixture Data

#### MANUFACTURING

496 - 6 Lamp T5HO High Bay  
(pre-existing motion sensors)

#### ATTIC

51 - 6 Lamp T5HO High Bay  
(pre-existing motion sensors)  
47 - 4 Lamp T8 Surface Strip

### LED Solutions

#### MANUFACTURING

496 - 156 W 25,000 Lumen LED High Bay  
with Programmable Motion Sensors  
and Diffuse Lens

#### ATTIC

51 - 156 W 25,000 Lumen LED High Bay  
with Programmable Motion Sensors  
and Diffuse Lens

### Energy Summary

104.60 kW Reduction  
752,547 kWh Reduction  
Reduction to Connected Load: 55.6%

### Economic Analysis

Utility Rebate: None Available  
Annual Energy Savings: \$39,943.30  
Estimated Simple Payback: 4.32 yrs  
IRR: 23%

## Background

Caterpillar Inc. is the world's leading manufacturer of construction and mining equipment, off-highway diesel and natural gas engines, industrial gas turbines and diesel-electric locomotives. Innovative products and services, backed by a global dealer network, provide exceptional value that helps customers succeed. Caterpillar does business on every continent, principally operating through three primary segments – Construction Industries, Resource Industries and Energy & Transportation – and providing financing and related services through our Financial Products segment.

Caterpillar facility management sought to replace the multi-lamp T5HO system at its Building H Chillicothe, IL manufacturing center to improve overall lighting levels, address lighting issues, eliminate maintenance issues, while reducing GHG and capturing annual energy savings.

Responding to Caterpillar's request, Illumadyne developed an LED lighting solution to meet the strict requirements while addressing the need for an attractively priced project. The chosen solution improved overall lighting levels, providing direct sensor savings with additional flexibility in light level adjustments.

## The New Lighting Design

Caterpillar desired an LED lighting solution which would address their needs across the facility while upgrading all high bay lighting to long-lasting high performance LED equipment. 90+ CRI will provide improved color accuracy.

The Illumadyne solution consisted of replacing all existing T5HO high bays with new Illumadyne LED high bays with onboard programmable motion sensors, diffuse lens, and custom hanging assembly to enable quick installation with the existing mounting configuration. The programmable sensors will allow facility managers to adjust high/low trim levels and sensor behaviors to better fit the needs of the workforce.

The Illumadyne team installed the system to provide improved lighting levels while reaping additional savings by setting high end trim and sensor behaviors for all manufacturing and attic areas before finalizing the project with Caterpillar facility management.

## Customer Feedback

“The job was done professionally and I appreciated how the crew worked around production and cleaned up after themselves.”

Lyle R. Fricke, EE, LEED AP  
*Americas Facilities Operations Project Engineer*

## Environmental Results

CO2 Reduction - 772.81 metric tons  
 Nox - 1.88 metric tons  
 Equivalent to:  
 # cars taken off road: 147  
 # of trees planted: 2,556

## LED Highbay Specification:

- 25,000 Lumens
- 156 System Watts
- 5,000K
- Diffuse Lens
- 90 CRI
- L70 = 140,000 HRS (50C)
- MCPCB
- 7-Year Limited Warranty



## Controls Strategy

The lighting controls strategy leverages on-board programmable sensors combined with an Illumasource 0-10 volt dimming driver. High-end trim was set to provide an average of 40-45+ fc in the main manufacturing areas. Luminaires are set to initially dim to 10% and hold for 15 minutes before finally de-energizing. New motion in the area will bring the luminaire back to full lighting output (90%).

