

# LED Tube Retrofit

December 4<sup>th</sup>, 2013



## Summary

Design and Installation performed by Advanced Power Technologies.

At the University of North Carolina – Charlotte, APT was given the opportunity to retrofit 13 recessed fixtures in an open office area in the facilities management office.

The existing lighting system consisted of 8 – 3lamp and 5 – 2lamp F32T8 recessed 2x4's with deep cell parabolic lenses. The average foot candles for the entire space ranged from 40-46 foot-candles. The existing linear fluorescent lamps were a mixture of both 3500 and 4100 Kelvin lamps.

The existing deep cell parabolic lenses posed a unique challenge as it is difficult for 120 degree LED tubes to produce a uniform light output from these style lenses. APT designed to use frosted lens LED tubes to eliminate the “pixelated” look associated with standard LED tubes.

The results were overwhelmingly positive. The frosted lenses on the LED tubes eliminated all striations and unwanted shadows. The overall light output was uniform across all of the work surfaces and the post foot-candle readings ranged from 44-49 foot-candles. APT designed to install cool white (5000 Kelvin) lamps and the result produced an increase in the CRI as well as an improved overall lighting quality.

The average installation time was equivalent to that of a standard linear fluorescent lamp and ballast retrofit.

APT's retrofit included the removal of the existing T8's and electronic ballast and the replacement of the “shunted” lamp sockets on one side bracket with new “non-shunted” lamps sockets capable of being wired directly to the power and neutral coming in to each fixture. By all estimates, approximately 40% of the lamp sockets existing today in any given space are considered “shunted” and require replacing. The installation time described above, includes the time to rewire the side brackets.

**\*Below are a few photos highlighting the results of the LED “Mock-UP” at the University of North Carolina-Charlotte.**



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## Energy Calculations

Based on information provided by the customer, APT has based all energy calculations and savings estimates on the following criteria:

kWh rate = \$0.0635

Annual Operating Hours = 2,600hrs

Area	Existing System	Fix Qty	Fix Watts	Total Watts	Annual Burn Hrs	Existing KWH
<b><i>Retrofit/Replacement</i></b>						
Facilities Management Open Office	2x4 3 lamp T8 Troffer	8	88	704	2600	1830.4
Facilities Management Open Office	2x4 2 lamp T8 Troffer	5	59	295	2600	767
						<b>2,597.40</b>

Proposed System Type	Lamp Wattage	Fix Watts	Total Watts	Total Watts Saved	Annual Burn Hrs	Proposed KWH	KWH saved
Retrofit - 2X4 3 Lamp 18W LED Tubes w/Sockets	18	54	432	272	2600	1123.2	707.2
Retrofit - 2X4 2 Lamp 18W LED Tubes w/Sockets	18	36	180	115	2600	468	299
							<b>1,006.20</b>

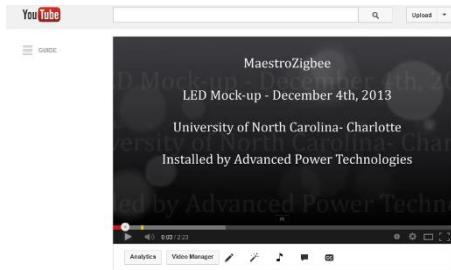
## Total Energy Reduction of over 38%



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**\*Please visit our YouTube video link below for a complete visual summary of the installation process and results.**

<https://www.youtube.com/watch?v=mVIWmd6AEGw&feature=youtu.be>



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