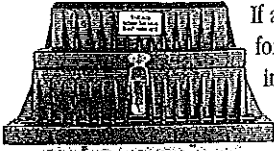


Finally ...

A Guide to Parking Garage Lighting

By Jeff Pinyot



If a company were to make a single type of light fixture for a parking garage – say, linear fluorescent or induction or LED – that company would do all possible to proclaim to, shout at, and even manipulate potential clients to believe that its technology and fixture were the only way to light a parking garage.

Truth is, there are *many* ways ... *many good* ways.

Over and again, the most valuable lesson an owner or operator can learn is the value of a trusted energy advisor. That's because each garage has an individual personality, so to speak, and needs.

To assume that a single light fixture and technology type will meet the specific needs of a garage is to be naïve. No way that a stairwell or elevator lobby or entry area or parking ramp will be served equally by the same single fixture type.

A trusted energy consultant will either manufacture or at least offer a slew of lighting options for your garage.

As a manufacturer and a provider of all lighting sources, I thought a review/recap of your lighting choices would be helpful. Therefore, I present **A Guide to Parking Garage Lighting ...**

General Overview:

I will provide a Summary of each current fixture type that we see used in parking garages, followed by trends and future considerations. Note that the vast majority of existing parking garages (ones that have not had a lighting retrofit) are illuminated by one of three methods:

1. **Linear Fluorescent (T12/T8/T5)**,
2. **Metal Halide (MH)** (175 watt or 150 watt, mostly), and
3. **High Pressure Sodium (HPS)** (150 or 100 watt).

When considering replacing these "energy hogs," as I call them – especially T12, MH and HPS – keep in mind that you don't want to reduce *lighting* levels, just energy and maintenance. So, you have to pick a replacement that will meet the lighting codes, established by the IESNA (Illuminating Engineering Society of North America), to minimize liability. (I will not discuss T12, MH or HPS as new lighting choices. If your consultant suggests any of these options for your new garage design or for a retrofit, fire him or her.)

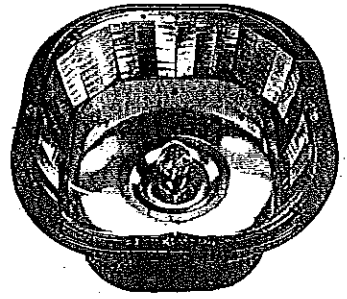
Today's lighting choices for parking garages

(From lowest-cost solution to highest)

1. Adding Controls to Existing HID Lighting

Summary: Lighting contractors may suggest adding a control device to your existing electrical panels to reduce the amperage serving your high-intensity-discharge (HID) lighting, promising savings of about 30% while reducing your lighting level minimally. This tradeoff is touted as "green" and low-cost. The problem is that this does not reduce the need to replace lamps and ballasts. Yes, it will prolong the life, and running at less than full power will allow the lamp to operate cooler, resulting in extended life and reduced degradation.

But, it can be like a bandage over a hemorrhage – it's not a long-term solution, and the cost can be almost as much as a new lighting system.



Usage: It may make sense to do this on top-level lighting that is costly to service. *Anything* that can extend the life of top level lighting and reduce energy may play out well.

2. Compact Fluorescent (CF)

Summary: Most compact fluorescent lamps come as retrofits into existing fixtures where the ballast has been bypassed. Some are included in new fixtures that generally originate from overseas. Typically, using a CF will still require heavy numbers of lamp changes (no ballast changes) because of short life, and lighting levels will generally suffer from CF unless multiple lamps are used. Exact some caution when considering this option, as altering a fixture will remove the UL certification, thus opening up some liability. Also, most old fixtures are in poor and brittle condition with a lens that has yellowed over the years. Prices could range from \$125 to \$200 in this category (fixture) and \$25 to \$75 (lamp).

Usage: Use CFs in stairwells where less broadcast illumination is required. Use in internal office and lobby spaces. Stay away from CFs in parking areas that often require a pattern of 30' x 30' placement.

3. Linear Fluorescent (T8/T5)

Summary: Linear fluorescents have come, gone and come back to parking. The T8 and T5 lamps have benefitted from great advancements in longevity and reliability. Ballasts last longer than ever, tubes last long, and cost is low. T8s and T5s generally are housed in vapor-tight fixtures. Usually equipped with two or three tubes to a fixture (32 watts per tube), they have nice output, but placement is critical.

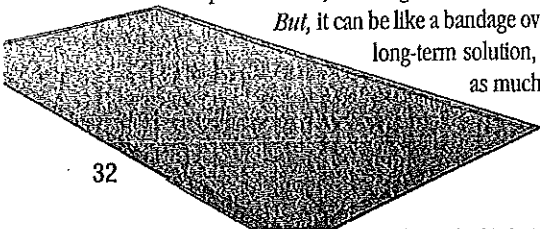
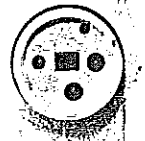
A 4' vapor-tight fixture will not serve a 30' x 30' light pattern without "light striping" a garage and possibly pulling it outside the max/min 10/1 lighting levels required by code. Open-air T8s are very popular in warmer climates and typically include a wire cage to protect vehicles and pedestrians from falling glass. When using T8/T5 fixtures in a (cold) northern climate, make sure you use vapor-tight fixtures because the cold will degrade the output at a rate of about 1% per degree F drop unless in a very tight fixture. Prices could range from \$125 to \$275 in this category.

Usage: Good applications are stairwells and close proximity replacement or new construction where you can place them where needed. Linear fluorescents remain a high-maintenance and shorter-life product. Most fluorescent fixtures will not last 10 years, so in a 10-year analysis compared with a traditional fixture that will last at least 20 years or more, you may have to include a complete new fixture purchase and installation within the ROI analysis, thus wiping out any economic benefits of this lower price solution.

4. Linear LED Tubes (T8/T5)

Summary: Linear LED tubes are all the rage. As above, you will find the same limitations, because it still is a *linear* solution (less end discharge than traditional lighting), but at a much better fixture efficiency.

Consider this: A traditional fluorescent tube emits light at 360 degrees requiring half of the light to have to reflect back out of the top of a fixture resulting in large



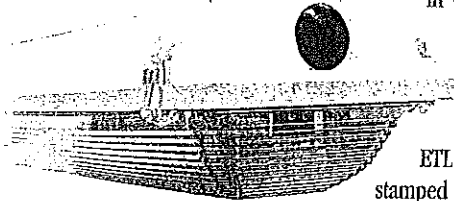
losses. With LED tubes, light is typically distributed over 120 degrees and always under 180 degrees out the bottom of the tube (not caught up in the fixture). Therefore, little to no light output is lost in the fixture rendering much more efficiency of power input. An LED tube will save approximately 40% energy over a T8 tube.

An LED tube typically is rated at 18 watts per tube and can be wired direct-line voltage, eliminating the need for a ballast or ballast dependent, keeping the existing fluorescent electronic ballast in place (be certain that you know what you have).

One big reason that we at ECO Lighting see such rapid paybacks with LED tubes is because if you leave the existing ballast in place, anyone can switch a tube in minutes. Plus, many utilities continue to give rebates to encourage the change. Understand that to get utility rebates, the tubes and fixtures have to be DLC (Design Lights Consortium) certified, and to do work in the US, tubes must be UL or ETL certified, as well. All tubes are *not* alike. Test them.

Refer to a previous *Parking Today* article titled "Tube Be or Not Tube Be" for more detailed information on LED tubes. Prices could range from \$20 to \$35 in this category (per LED tube @ 4' length and 18 watts).

Usage: Apply this product as a new fixture as discussed with linear fluorescents, or replace existing T8 or T5 tubes with new LED tubes to experience about a 40% energy reduction and improved lighting levels. It is imperative to do a demo and be sure to cycle the lights on and off to make sure the tube works in your existing fixture. Most tubes work only with electronic ballast, and if put in while a fixture is energized, may not relight if power is taken down if the ballast is a magnetic type. *Never* use a tube that is not UL, ETL or DLC certified. It will be stamped on the tube, but still do some research and get references. (Anyone



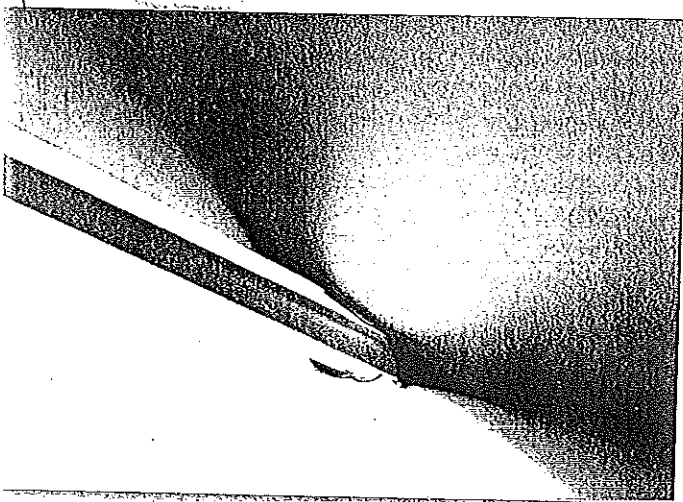
can print a label that says UL, ETL and DLC ... and many do.)

5. LED Panel Fixtures

Summary: Get rid of those ugly troffer fixtures in your elevator lobbies and office spaces. You've seen them or probably work under some every day. Characterized by different colored fluorescent tubes, some burned out, spiders and flies above the yellowed plastic, the LED panel fixture is here to save the day.

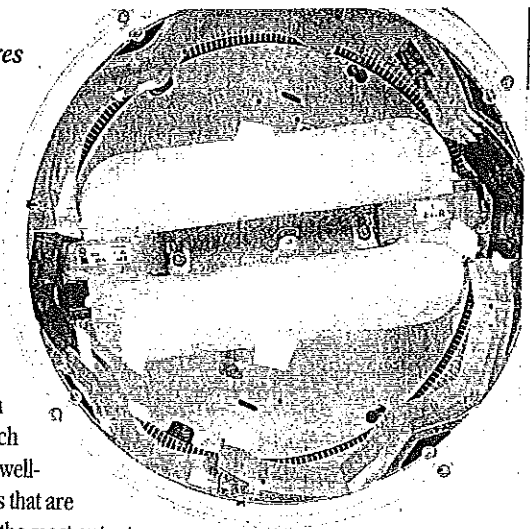
A 2' x 4' or 2' x 2' (other sizes also available) drop-in panel with perfectly clean, smooth optics will take a 128 watt (4 tube) linear troffer to just 50 or 70 watts and will get a rebate in the neighborhood of \$50. Not bad for a fixture that prices in the range of \$150 to \$250. These are also dimmable. Still insist on UL, ETL and DLC.

Usage: As noted, use in elevator lobbies, as architectural statements, in offices and even in dropped-ceiling parking garages. They are perfect for alet drop-offs.



6. Linear LED Fixtures (non-tube)

Summary: Linear LED fixtures are becoming commonplace. These fixtures on not vapor-tight with imported LED tubes, but a variation of them. Be careful here. Some are simply one or more strips of LED mounted into an off-the-shelf vapor-tight with a clipped-on lens. Some, such as the new ECO Mantis, are well-engineered top-shelf products that are designed to manage heat, get the most output from a fixture, and offer unique features.



No two are alike. It is imperative that you examine these as potentially completely different fixtures. Remember, cheap is aptly named ... cheap, and you will likely be replacing them in short fashion. The good ones are well worth the spend. Again, don't buy one of these unless they are UL or ETL, and DLC certified. Prices could range from \$125 to \$300 in this category.

Usage: Use a Linear LED (non-tube) fixture in so-called Double T garages where uplighting is not as important. Use to replace any traditional parking fixture. Make sure the light emerges beneath the Ts. Some companies offer uplighting as a feature. If you use uplighting and are applying it to a cast in place garage, make sure you hang it below the ceiling to get proper "bounce" to take advantage of the uplighting. (The ECO Mantis fixture also offers a patent-pending colored uplight option to help customers remember what floor they parked on.)

7. Induction fixtures (T17)

Summary: Induction fixtures have been solid performers for years, and were an excellent bridge product from HID's to LED's. While LED's were improving in performance and cost, the induction was a reliable gap product. Domestic induction is still the most robust performer in parking lighting. Boasting an extremely low failure rate and huge energy savings over HID's, the induction is still a strong performer. Unfortunately, the efficiency of lumen output is stuck in its current place, while the sky is the limit with LED.

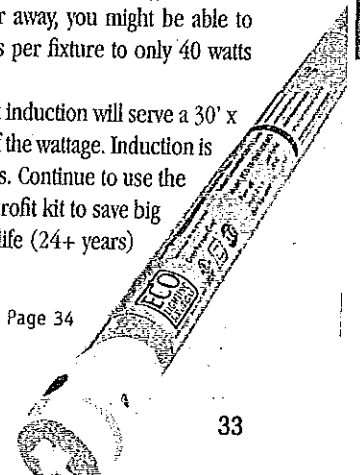
An induction fixture today may be half as efficient in output as a well-designed LED, but still twice as efficient as an HID that it is replacing. As LED drops in price, induction is being left behind. This is recent information, as the switch is on.

If you currently have a garage with Induction lighting, that means you were brilliant and didn't wait until LED's became affordable. You experienced huge savings for years, and your lighting projects are paid off and making you big money continually.

In all lighting solutions, pay attention to utility rebates, energy rates and equipment costs. One day, and maybe not so far away, you might be able to reduce your energy consumption from 100 watts per fixture to only 40 watts per fixture. Actually, that day already exists.

Usage: Still great for parking garages, a 100 watt induction will serve a 30' x 30' light pattern well; a good LED may do it for half the wattage. Induction is a slam dunk over LED in top-level lighting retrofits. Continue to use the existing fixture and retrofit it with an induction retrofit kit to save big over LED head changes and enjoy the super-long life (24+ years) for outdoor induction lights.

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Many clients still love induction, because no fixture in the history of parking garage lighting has experienced such reliability and longevity. LED is too new to make conclusions, and there is some absolute LED crap in the marketplace that often gives LEDs a bad name. (I've seen LEDs mounted on a cardboard backing slapped in a box touting big claims. All that manufacturer got was a big claim against them when the fixtures started falling in days.)

8. LED fixtures

Summary: What to say? LED is clearly the most revolutionary lighting development of all time beyond the light bulb itself. Today, LEDs from a fixture can deliver 125 lumens per watt of output even with fixture losses virtually reducing a traditional 175 watt MH that draws 208 watts to a meager 40ish watt LED fixture.

All LEDs are not equal. You can take that statement to the bank.

Most LED fixtures are presented as an unshielded glare discharge from the bottom of the fixture where a pattern or field of LEDs is directed to various paths by acrylic lenses called TIRs (total internal reflectors). These TIRs do nothing to shield the LEDs from their dangerous and potentially litigious glare.

Most LED fixture manufacturers have fixed this issue by now offering reduced glare and shielded ones. Use only that kind; there are plenty of good ones. Make sure you use an ETL, UL and DLC certified fixture.

LEDs are highly energy efficient, prices are dropping, and performance is improving. Today, it is without reservation that I can say that some form of

LEDs will likely "money out" the best long term on your project.

Do a side by side comparison to make sure you like what you are getting. Uplighting, for example, is a critical need in a parking garage, and the DLC, some cities, and others will argue otherwise. But as a parking lighting expert, I say that uplighting is critical to expanding the size of the garage. Heck, you paid for the volume of the garage, why not illuminate the whole thing? Illuminating the ceiling (in a poured slab design) creates a safe and inviting environment. Uplighting illuminates signs, pillars, walls, people, cars, etc.

Don't fall for the light pollution fairy tale in parking lighting. I've yet to see light transfer through concrete. As long as the light is not mounted on the extreme edge of a garage, the concrete will not allow the light to cross the horizontal plane, thus making upward (dark sky issues) light pollution impossible.

Advancements in LEDs are commonplace and daily. Theoretical efficiencies are so high that they are nearly unbelievable. Remember the days where you put a 75-watt lamp beside your bed to read a book by? Now, a 75-watt parking garage lighting fixture is considered an energy hog. Prices in this category could range from \$250 to \$450.

Usage: LED fixtures are all the rage in parking today, and they have a solid and long future. Whether in a linear fashion or in this traditional HID fashion, LEDs will be here for many tomorrows. Once touted as the lights source of the future, the future has arrived. With many more advancements on the horizon, the story will only get more exciting. The belle of the ball – the glass slipper does fit the LED.

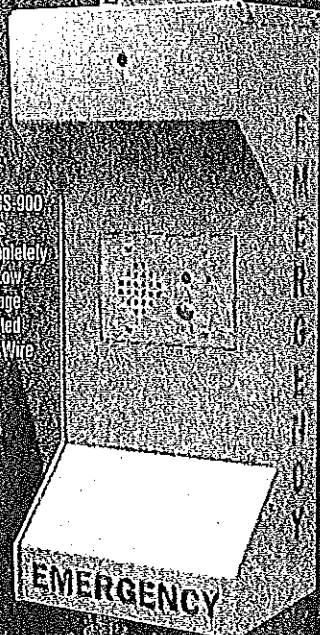
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