Case Study – The City of St. Petersburg

The City of St. Petersburg is the 4th largest city in the State of Florida serving a population of 245,314.

St. Petersburg was designated as the first city in the state to become a "Green City" by the **Florida Green Building Coalition (FGBC).**

Over the last few years, the City has worked with **Resource Efficiency Solutions, Inc. (RES)** to identify and implement quick payback Energy Conservation Measures (ECMs) as summarized in the rest of this document.

City Hall New Induction and LED Lighting

The building's five existing 180 watt and seven existing 120 watt metal halide fixtures were replaced with 12 new 40 watt induction flood lights to wall wash City Hall, as pictured to the left.

The new fixtures represent an **energy savings of 72%**. Also, the induction lighting has a much higher Color Rendering Index (CRI) than the existing metal halide lighting and provides a whiter light with reduced glare, helping to improve security.

The two existing 215 watt metal halide flag pole lights were replaced with two new 13 watt weatherproof LED lights as pictured above. The new fixtures represent an **energy savings of 94%**, last 50,000 hours and provide a better color rendering index than the original metal halide fixtures.

Also, the original metal halide fixtures would frequently become wet and burn out long before their rated life of 15,000 hours. The new IP65 rated (weatherproof) LED fixtures have solved this problem.

City Hall LED Elevator Lights

City Hall's elevator originally used 50 watt incandescent bulbs that gave off a lot of heat and did not last long. The City tried replacing these bulbs with 12 watt fluorescent bulbs.

A problem arose when the City tried to shut off the elevator at night. The fluorescent bulbs would not ignite to full light output on startup, and the elevator was too dark. Also, the vibration of the elevator caused frequent fluorescent lamp burnouts.

RES developed a 6 watt LED solution that provides comparable light levels to the incandescent bulbs, without the heat, and that has an **energy savings of 88%.** Also, the LED bulbs have an energy **savings of 50%** when compared to the fluorescent lamps with no internal filament that is affected by vibration. With a rated life of 50,000 hours, the LED bulbs will last about 25 times longer than the incandescent bulbs, or the fluorescent lamps that had frequent burnouts due to their internal filament failure caused by the elevator's vibration.

Main Library Lighting Replacement

The City of St. Petersburg's Main Library recently completed an extensive renovation. A major challenge of the renovation was finding an efficient lighting system to replace the library's metal halide and incandescent recessed can fixtures, of varying sizes (6", 7", 10" and 12") and wattages (65 watts to 210 watts), without having to tear apart the facility's gypsum ceilings.

RES was able to use a combination of induction and LED recessed can style fixtures to replace all the existing fixture types and wattages without disturbing the gypsum ceiling. The project has an average **energy savings of 70%**. The library staff is very pleased with the retrofit and has commented that the library is now much brighter.

Also, the library's 120 watt exterior canopy high pressure sodium lights were replaced with new 40 watt induction lights, yielding an **energy savings of 67%.**

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Parking Garage New Induction Lighting

The existing 180 watt high pressure sodium fixtures inside the City's South Core parking garage were replaced in 2009 with 85 watt induction fixtures. The project has an **energy savings of 53%** and zero failure to date.

The induction fixtures have a rated life of 100,000 hours, about five times longer than the existing high pressure sodium fixtures. Also, the existing high pressure sodium lamps frequently burned out long before their rated life because of the vibration in the garage. Induction lighting has no internal filament and is not susceptible to vibration. The photo at the left shows the existing high pressure sodium fixtures in the middle floors pictured between the new induction fixtures on the top and bottom floors.

The cupola had four 1500 watt quartz lights that were replaced with four 400 watt induction fixtures. This creates an **energy savings of 73%.**

The 90 watt high pressure sodium recessed ramp lights were retrofitted with 23 watt self ballasted induction screw-in bulbs.

The ramp retrofit represents an **energy savings of 74%.**

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Coliseum Induction and LED Lighting

The Coliseum sign had been lit with 60 watt incandescent bulbs that were replaced with 8 watt LED. **Energy savings=87%.**

Along the exterior of the building, the 500 watt quartz lights have been replaced with 24 watt LED lamps. **Energy savings=95%.**

Below left, a 40 watt induction canopy fixture replaced two 90 watt halogen spot lamps. **Energy savings=78%.**

Other outside fixtures at the main entrance replaced 60 watt incandescent recessed cans with 7.5 watt LED lamps. **Energy savings=88%.**

The 90 watt exterior wall packs leading up the stairs were replaced with 15 watt LED wall packs. **Energy savings=83%.**

The 25 watt blue and white accent lights in the rafters of the St. Petersburg Coliseum were replaced with 1.8 watt blue and white LED lights. The new LED lights represent an **energy savings of 93%** when compared to the existing incandescent fixtures.

The existing incandescent bulbs only lasted about 1,000 hours and were very costly for the City to maintain. The new LED bulbs not only save significant energy, but they have a rated life of30,000- 50,000 hours.

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Accent and Specialty Lighting

The 120 watt metal halide fixtures used to illuminate the sculptures in the City's Grand Central District were replaced with 13 watt weatherproof LED spot lights. The project has an **energy savings of 89%.**

The photo at the left shows one of the Grand Central District's sculptures on Central Avenue near the I-275 overpass.

In the background, notice the white light of the acorn style street lights (with induction retrofit kits) compared to the yellow light of the high pressure sodium fixtures on the I-275 overpass.

The existing 120 watt metal halide fixtures used to illuminate the Medjool Palms (2nd Ave. North median near Bay walk complex) were replaced with 13 watt IP 65 rated (weatherproof) LED spot lights as pictured above.

The project has an **energy savings of 89%** and solves the problem of frequent metal halide lamp failures when the existing fixtures get wet.

The Bay walk palm trees pictured below are being illuminated with a **40 watt induction flood light**. Several additional locations within the Bay walk complex are similarly lit.

Along with highlighting the landscaping of the Bay walk complex, the new LED and induction lights have greatly enhanced the nighttime security of the complex.

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Accent and Specialty Lighting Continued

The metal halide acorn style fixtures along St. Petersburg's Beach Drive were retrofitted with custom designed induction retrofit kits. In some instances, a T-bar was installed on the existing poles so a 13 watt LED spot light could be added to illuminate the City's Banyan trees at night.

The Salvador Dali Museum opened their doors at the new location, on the St. Petersburg waterfront, in January of 2011. To add drama to the unique structure of the building, two 13 watt IP 65 rated (weatherproof) LED spot lights are highlighting each palm tree surrounding the museum.

The St. Petersburg Sailing Center replaced four 400 watt (460 with ballast) metal halide shoe box floods with four 200 watt shoe box induction floods. This generated an **energy savings of 56%.**

City Street, Neighborhood and Park Lighting – Induction Retrofit Kits

Approximately 2,000 of the City's Acorn style lights were retrofitted with custom made induction retrofit kits as pictured above. The retrofit kits were installed on city streets, neighborhood streets and in city parks.

Existing metal halide and high pressure sodium systems ranging from 120 watts to 290 watts were replaced with 55 watt to 165 watt induction retrofit kits. The project has an average **energy savings of 60%**. Also, the induction retrofit kits have a rated life five to ten times longer than the systems they replaced and are expected to **last for over 20 years** when operated 12 hours per day.

For busy city streets, a bright white temperature color of 5000 Kelvin was used. For neighborhood streets where residents preferred a "warmer" color, a warm temperature color of 3000 to 4000 Kelvin was installed.

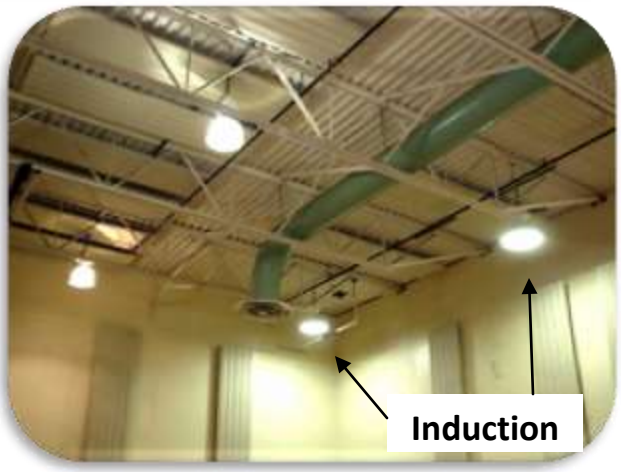
Recreation Centers

In the gym at the Walter Fuller Recreation Center two 400 watt metal halide lamps were retrofitted with two induction fixtures. Foot candles and heat measurements were taken and go as follows:

MH:
1) 180 f/c and 174°F
2) 260 f/c and 170°F

Induction:
1) 400 f/c and 74°F
2) 419 f/c and 74°F

*Notice the induction fixtures are almost double the foot candles and half the temperature of the metal halide.



Fleet Management

The 175 watt cobra head fly fixture on the Security Lizard was replaced with a 100 watt induction cobra head fixture. This greatly reduces maintenance costs and increases **energy savings by 51%.**

The fleet management building had 1000 watt quartz light illuminating the flag pole. This was replaced with a 38 watt LED spot fixture generating a **96% energy savings** as well as **increasing the rated life by 63,000 hours.** This fixture has and estimated payback of less than 1 year.

In the West Service Island the existing ten 175 watt metal halide canopy fixtures retrofitted with twelve 40 watt Induction canopy fixtures and two/2 lamp T12 vapor tight fluorescent fixtures in this area were completely removed. This has saved a **total of 1800 watts**, increased light levels dramatically, and greatly reduce maintenance costs. (Over $500 a year)

Fleet Management Tire Shop

After

Before

Outside the service bay of the tire shop there were two 150 watt quartz fixtures, one 400 watt metal halide flood, two 70 watt wall packs and two 90 watt PAR 38 halogen lamps. The existing flood lights were retrofitted with four 40 watt induction nipple mounted floods and one 200 watt yoke mounted flood **saving 67% in energy**.

Inside the service bay the existing seven, 8 foot 4 lamp, T12 fixtures were replaced with 8 foot tandem strip fixtures with T8 Sequoia long life lamps, saving 246 watts per fixture. The recessed T12 fixtures and surface mounted T12 fixtures were retrofitted with T8 Sequoia long life lamps and the ballasts replaced with electronic. This saved 68 watts for each 4 lamp fixture and 26 watts for each 2 lamp fixture. Total watts saved=1722.

Before

After

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Fleet Management Site Lighting

The site lighting around the complex was retrofitted as follows:

- Eighteen 1000 watt metal halide lamps replaced with 400 watt induction
- Five 400 watt metal halide replaced with 200 watt induction
- Ten 400 watt high pressure sodium cobra heads replaced with 200 watt induction
- One 300 watt quartz fixture replaced with a 100 watt induction flood

The rated lamp life of the higher wattage (over 250 watts) HPS and metal halide lamp is only 20,000 hours (when 50% work and 50% don't work). The rated life of induction is five times longer at 100,000 hours has greatly **reduced maintenance costs by over $3000 a year**. The new white light induction will also improves security and safety due to much better color rendering. This project has a total of **16,390 watts saved**.

The exterior flood lights had three 90 watt PAR 38 halogen flood lamps, one 150 watt quartz fixture, and one 70 watt flood in this area. They were replaced with one 80 watt wall pack (for the 3 floods) and one 40 watt nipple mounted induction flood reflecting **76% in energy savings.**

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Fleet Management Site Lighting Continued…

Before

After

Outside the Light Maintenance shop there were four 150 watt quartz light fixtures used to illuminate the welding area. These were retrofitted with two 80 watt yoke mounted induction floods. This retrofit saves on maintenance by reducing the amount of fixtures, increasing the rated life by 80% and increasing the **energy savings by 73%.**

Some other advantages of the new induction lighting when compared to the original metal halide lighting (MH) include:

- ✓ Long life of 100,000 hours compared to 15,000 for MH. If the light operates 12 hours per day, 100,000 hours represents a useful life of about 22 years.
- ✓ Induction lighting turns on instantly.
- ✓ No flickering, ballast hum or noise.
- ✓ Induction lighting is not affected by vibration.
- ✓ Low lumen depreciation over the life of the fixture.

Fleet Management Vending Misers

RES supplied Fleet Services with 10 Vending Misers for their cold drink machines and replaced 10 EXIT signs that went from incandescent to LED.