

Rigorous Six Sigma verification procedures help Mercury Marine cut lighting costs 60%

The essence of Lean manufacturing is to do more with less. So when Mercury Marine, a leading outboard motor manufacturing firm headquartered in Fond du Lac, Wis., began implementing Lean manufacturing strategies, it made sense that one of their primary targets would be energy consumption.

“Our energy-efficiency efforts started as part of a Lean Six Sigma initiative to help cut costs in each of our facilities,” said Steve Luedtke, a plant engineering project manager at the Fond du Lac location.

“Six Sigma helped us choose the parameters to measure the claims of lighting vendors. We looked at five different companies and were very happy we chose Orion. Compared to our previous 320-watt fixtures, the Orion 4-lamp fixtures use 60% less energy, produce 30% more light and last 20% longer.”

Because of the energy savings involved, payback was about two years on the project, with an ROI of just over 50%.

“One of our requirements had been that we wanted significant energy savings with no worse light levels than we had with the pulse-start metal halides we had previously. The better lighting was frosting on the cake.”

After assessing the rising cost of energy spent on lighting and after consulting with Orion Energy Systems, Mercury’s answer was to implement completely new and uniform lights throughout their six facilities and 2 million square feet of production space in Fond du Lac.

“We’ve had no complaints,” Luedtke said. “No one has asked to put the old ones back.”

Orion Energy Systems was not only able to save Mercury Marine \$382,636 annually, but working conditions were improved, and the average power consumption per day has decreased from 686 kW to 557 kW.

Mercury chose Orion’s 4-lamp T8 CM4PL unit that uses 147 watts and a black ballast pack. Their reasons included:

- Orion’s patented design with optical and thermal efficiencies that deliver an average of 50% more light at half the energy usage, as compared to some traditional high-intensity discharge (HID) lighting fixtures. Orion’s CM Series uses a patented reflector design logic that harvests all 360 degrees of light in delivering increased foot-candles to the floor.

- A modular plug-and-play design for simplified installation and maintenance. This design also readily accommodates upgrades, such as motion sensors, modular power extenders or advanced controls.
- A patented aluminum “I” frame that means lighter-weight construction, which, in turn, makes installation and maintenance easier.

Mercury’s maintenance department did some testing all its own. “We tested it to see how hard it would be to get the lamp to fall out of fixture – that was one of our biggest concerns, and it was very hard to get a lamp to fall out,” said John Potratz, facility electrician. “It’s a very tough lamp, even though it’s lightweight.”

Potratz said that because of the Orion design, the fixtures were easier and quicker to install than other types. It’s easy enough that Mercury Marine’s maintenance staff was able to hang a majority of them, which saved the company on installation costs.

“The light hangs from only two points and it plugs in, so there’s no hardwiring involved,” Potratz continued. “If there is a plug in the ceiling and a place to tie the hanging cable, you can hang one in 15 minutes.”

“Even changing the ballast is easy – two clips hold it in and they snap out; then you unplug and remove the old ballast, plug in the new one, reclip it and it’s ready to go. The only possible wiring is getting the right plug – and you can order that from the factory.”

Mercury also likes the project’s operational data. Annual savings to the company from the retrofit project have been put at about \$382,636 per year in energy costs alone, (\$127.54 per fixture) with displaced energy of 5,866,720 kWh per year and displaced capacity of 672 KW. The energy reduction also means, according to accepted EPA formulas, a CO₂ reduction of 4,012 tons per year, or the environmental equivalent of planting a 1,080-acre forest, removing 951 cars from the road, or saving 485,955 gallons of gasoline a year.

“These types of programs offer a way to cut costs instead of through the headcount,” said Facilities Planning Director David Michaelson. “When you look at it from that perspective, I think it would be difficult to find anyone who wouldn’t be interested in looking to become more energy efficient.”