

CASE STUDY

ROLLING ALONG WITH ELECTRIC LIFT TRUCKS

CHALLENGE

Operating internal combustion engine (ICE) material handling equipment in an indoor environment can present worker health and safety challenges due to engine noise and emissions. ICE equipment also requires significant maintenance.

OLD WAY

HEXPOL, a world-leading advanced polymers group, sought to reduce the challenges associated with operating ICE material-handling equipment at its Jonesborough, Tenn., manufacturing plant and warehouse. HEXPOL's forklifts move products used in the company's synthetic compounding operations around the plant and transport finished goods to the warehouse.

NEW WAY

In 2016, HEXPOL replaced two propane-powered forklifts with 5,000-pound, battery-powered electric models, and took steps to replace the remaining 12 by year's end. HEXPOL worked with regional material-handling equipment distributor, The Bailey Company, to acquire the lift trucks it needed.

With the change, HEXPOL also implemented the relatively new battery-charging regime known as opportunity charging. In opportunity charging, batteries remain on the forklifts and are efficiently charged using "smart" chargers at times convenient for the operator, such as during meal breaks. An opportunity charging period typically lasts 30 to 40 minutes; the goal is to keep battery state of charge (SOC) between 40% and 80%. Occasionally, when a forklift experiences heavy use, a full charge will be required, taking up to six hours. On a weekly basis, the battery must undergo an equalization charge, which brings all cells to an equal voltage and the battery to a 100% SOC.

An opportunity charging regime ensures forklifts are always available on the job. The benefit of availability, however, comes with a tradeoff of shorter battery life, so the two must be factored into a purchase consideration. For instance, with



opportunity charging, a five calendar-year replacement cycle may be shortened to three calendar years, but the numbers of operating hours over those three years is typically much higher than over a traditional five-year cycle because opportunity charging makes the forklift more available to operators.

Opportunity charging differs from traditional charging methods that typically require overnight charging or battery swapping. Battery swapping entails cranes to remove batteries from the forklift, a separate, dedicated charging room or area, and, usually, at least two battery packs per truck (one in use and the other charging). With opportunity charging, these added equipment expenses, space needs, and personnel time, are avoided.

BrightRidge, HEXPOL's local power company, partnered with Tennessee Valley Authority to demonstrate to HEXPOL how electric material-handling equipment could be cleaner and more economical than ICE equipment over its lifetime. TVA tapped its EnergyRight Solutions Program, awarding HEXPOL a \$2,000 incentive per forklift to reduce the upfront cost of the new lift.

RESULTS

The customer is happy with the electric lift. Maintenance costs are lower, in part because electric equipment has only 10% of

the moving parts of the ICE counterpart. The electric forklifts require maintenance about every three months. The electric forklifts also operate quietly, allowing workers to be more aware of their surroundings and thus safer. Employees also benefit from the lift trucks' emissions-free operation.

“The switch to electric lift trucks made a fairly major impact in our daily operations, specifically in quieter operations and reduced emissions,” said HEXPOL Jonesborough Maintenance Manager Steve Young.

BOTTOM LINE

Using EPRI's online lift truck calculator, the cost to purchase, maintain, and charge an electric truck for a period of three years was estimated to be \$61,000, versus \$97,000 for the propane-powered alternative over the same period. Maintenance alone was about \$11,000 less per year with an electric truck. Assumptions for the calculation were 4,800 annual operating hours; \$2.20/gallon for propane; \$0.08/kWh for electricity.

FOR MORE INFORMATION

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