

CASE STUDY

MERCHANTS DISTRIBUTORS SAVES MONEY AND ENERGY WITH ELECTRIC REFRIGERATED TRAILERS

CHALLENGE

Temperature control during transport of produce and frozen goods is necessary to ensure food safety and quality. For decades, the trucking industry has relied on refrigerated trailers or truck refrigeration units (TRUs) powered by the truck's diesel engine or a dedicated diesel generator. When trucks are parked at loading docks and staging areas, however, idling truck engines or running generators to keep TRUs operating generates emissions, consumes fuel, and is costly.

OLD WAY

Merchants Distributors (MDI), a privately owned wholesale grocery distributor headquartered in Hickory, N.C., sought a more efficient solution for its refrigerated trailers. The company, which began in 1931 as a small family business, now serves 600 retail food store customers throughout the Southeast and Mid-Atlantic states.

MDI's 1 million-square-foot distribution center operates 24 hours a day. Its 1,500 employees manage 220 tractors (trucks) and 400 refrigerated trailers. MDI's trailers are equipped with three different temperature zones to handle different food products: ambient, refrigeration (40°F), and freezer (-10°F). Drivers complete an average of 800 routes weekly to serve the territory.

Brent Vaughan, MDI's Director of Facilities Engineering, evaluated alternatives to diesel-powered TRUs. Among the options were electric TRUs (eTRUs) that operate as hybrid units; the refrigeration trailers are conventionally powered by a diesel engine or generator-powered refrigeration compressor while on the road and by electricity from the grid when stationary at loading docks and staging areas.

NEW WAY

Working with Duke Energy, in 2016, MDI installed 36 electric service points in a staging area. Each service point, with a 480-volt connector, meets the needs of an eTRU that can draw up to 17 kW peak cooling capacity. Typically, an eTRU draws 2 kW to 10 kW when in use. The installation was designed to



Trailers operating on 480-volt electric service points in the staging area (during the daytime when most are out for deliveries).

support more than 100 eTRUs. The number of eTRUs on site has since increased, leading to greater utilization of the service points. Additional service points will be tied to future need.

RESULTS

Energy and Cost Savings

MDI initially saved about 2,600 gallons of diesel fuel per month, a number that has risen to approximately 3,300 gallons per month commensurate with the company's growing eTRU usage. The electrical energy that displaces the diesel averages 18,000 kWh per month. At an average diesel cost of \$3.03 a gallon in the Southeastern U.S. and average commercial electric power cost of \$0.069 per kWh, MDI's net energy savings average \$8,700 each month.

For an allocated electric service point installed cost of \$7,500, the payback is approximately 2.6 years.

Other Benefits

"A major benefit is the reduction in noise pollution, which helps us be a better neighbor and improves the quality of our work atmosphere," said Vaughan.

There are also reduced emissions at the site. This benefit is offset by emissions associated with electricity generation; however, those emissions occur at the power plant and will decrease as Duke Energy's renewable mix grows.

BOTTOM LINE

“Duke Energy took a collaborative approach throughout this process and was interested in helping us improve our business and services,” said Vaughan.

“This entire experience has been really positive,” said Vaughan. “With our tracking system, we’ve seen the usage we expected and even a little better. Duke Energy has been really good to work with, and as we evaluate new ways to increase our efficiency and lower costs, we’ll continue to rely on their expertise and advice.”

FOR MORE INFORMATION

For more information, contact the EPRI Customer Assistance Center at 800.313.3774 (askepri@epri.com).

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MDI installed 36 electric service points, enough to support more than 100 eTRUs.

Electric Power Research Institute

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