LITHIUM-ION HELPS PAPER AND PACKAGING OPERATIONS CUT COSTS AND EMISSIONS WHILE BOOSTING PRODUCTIVITY

CHALLENGE: Reduce costs and emissions in paper and packaging production environments

SOLUTION: Hyster® lift trucks powered by lithium-ion batteries

RESULTS: Optimal efficiency, sustainability and cost savings for handling loads in specialized paper production facility

// CHALLENGE

Two large providers of paper and packaging solutions in North America faced similar challenges within their material handling operations. In order to limit costs, reduce emissions, improve their work environment and boost labor utilization, the paper and packaging companies partnered with Hyster Company.

Paper and packaging production and distribution facilities can be harsh environments characterized by dust, dirt and demanding work for forklift operators. One of the customers relied on internal combustion engine (ICE) lift trucks powered by diesel or propane. These power sources produce strong fumes, emissions and heat, particularly if the truck is in use for long stretches or even all day.

The other customer counted on lead-acid batteries as the motive power source for their forklifts. While this power source does not produce tailpipe emissions, the heavy batteries presented other challenges for the fast-paced paper facility. To overcome long charging times, they would change out a depleted battery for a fresh one, rather than put the lift truck out of use for the entire charging period. This type of battery change out puts an additional burden on the operator; it can be complex and time-consuming, cutting into their productive time. The useful life of lead-acid batteries did not always last the full length of the lift truck lease term either, resulting in productivity losses or even replacement costs as the battery's power and ability to hold a charge diminished.

// SOLUTION

Both paper companies needed a motive power solution for their lift truck fleets that would not only reduce emissions to support sustainability targets and improve employee comfort and well-being, but deliver efficiency gains and cost savings.

Working with each business to pinpoint their specific needs, the Hyster team recommended fleets powered by lithium-ion batteries and developed a comprehensive strategy to help each customer navigate the transition.

A smooth transition from legacy motive power sources to newer battery electric technology requires choosing the right battery, support and financing for the particular customer.

EQUIPMENT SUMMARY

ICE to lithium-ion

- 130 lithium-ion ready lift trucks including some equipped with paper roll clamps
  - 30 E120XN paper roll clamp trucks
  - 100 E50XN with various attachments depending on application needs
- All trucks equipped with Hyster Tracker™ telematics
- Hyster Reaction™ operator assist solution on a few trucks for trial

Lead-acid to lithium-ion

- 684 lithium-ion ready lift trucks
  - 30 units E120XN paper roll clamp trucks
  - 654 units E50XN with various attachments depending on application needs
- All trucks equipped with Hyster Tracker telematics
- Hyster Reaction operator assist solution on 100% of electric fleet moving forward

Matching the charger and battery to the operation

The chemical compound of lithium-ion batteries varies by manufacturer. Compounds have varying temperature range tolerances and expected lifespans, so the right decision requires matching the choice to the needs of the specific application. Battery warranties are also important, and each manufacturer's is slightly different, so operations need to be sure to evaluate the warranty and how it measures use, whether battery hours or cycles.

DIFFERENT BATTERIES FOR DIFFERENT SOLUTIONS

	Chemistry	Temperature	Warranty
Supplier 1	Lithium ironphosphate (LFP)	-4° - 131°F	5 years 3,000 cycles
Supplier 2	Nickel manganese cobalt (NMC)	-40° - 113°F	6 - 10 years 5,000 cycles
Supplier 3	Lithium ironphosphate/ Nickel manganese cobalt (LFP/NMC)	-20° - 120°F	5 years 2,500 cycles

Securing strong support

Strong partners, including the lift truck dealer and the battery vendor, are also critical to effective implementation and ongoing support of a new electric power source. Hyster lift trucks are compatible with one of the industry's widest range of battery types and suppliers, enabling an unrestricted choice of provider, based purely on operational requirements – not limited by a lack of compatibility. Working with a trusted dealer who has full understanding of battery supplier options can help the customer choose a vendor who not only provides batteries compatible with the forklifts, but who will be supportive and collaborative in addressing questions and troubleshooting throughout the implementation process.

Finding a financing solution

Finally, to align the new motive power source with not only the operational but financial needs of the business, the customer must choose the right financing approach.

As a very mature electric power option, lead-acid batteries offer a lower cost of acquisition than lithium-ion. However, lithium-ion batteries typically have a two-to-three time longer expected life, generally 2,000 to 3,000 charges compared to 1,000 to 1,500 for lead-acid batteries. Structuring the financing to take advantage of this, by using one lithium-ion battery for two consecutive lift truck leases, can help make the cost more comparable to that of lead-acid. Battery life varies dramatically depending on how much a forklift is used and the number of shifts, but with lead-acid batteries, typical warranties are five years. But with lithium-ion, the supplier's guaranteed battery life is often 10 years. If the lithium-ion battery vendor has an hour life guarantee that is at least double the lease term hours of the truck, the battery can be leased for a longer term than the truck, and at the end of one forklift lease, the battery can be used in another truck.

// RESULTS

By making the switch to lithium-ion powered forklifts, the paper manufacturers eliminated internal combustion emissions or lead-acid battery charging fumes and realized productivity gains.

FINANCIAL IMPACT

ICE to lithium-ion

Customer saved $1.5 million from switching just one facility's fleet

Lead-acid to lithium-ion

By extending the battery financing, the transition to lithium-ion was cost effective for the customer

OVERALL SAVINGS

Source of savings and productivity gains:

- Lower energy bills due to the charging efficiency and regenerative braking capability of lithium-ion
- Reclaimed battery storage and charging space
- Eliminated battery maintenance costs

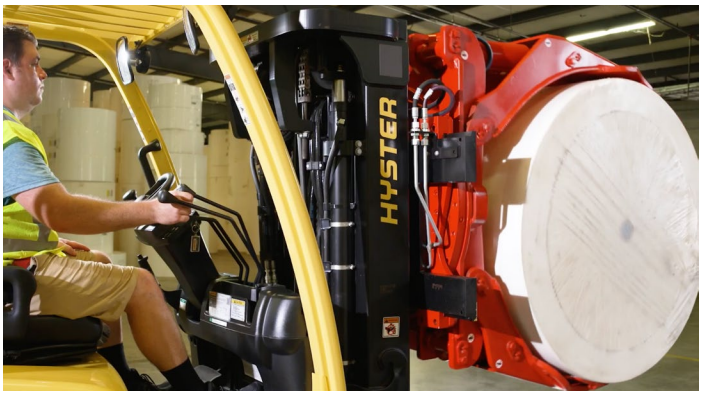
Lead-acid	Special watering system, safety equipment and properly trained workers required
Lithium-ion	No cleaning, watering, cool down or equalization requirements

- Reduced operator and equipment downtime

Lead-acid	Eight hours to charge, eight hours to cool and 20 minutes or more for battery change-out and maintenance, every four to eight hours
Lithium-ion	Fully charges three times as quickly, in as little as one to two hours, with no time required to cool, plus opportunity charging with no memory degradation

The customer who switched from ICE trucks reduced their energy expenses, and because electric-powered lift trucks have fewer wearable parts than their ICE counterparts, the customer also stands to save on maintenance and parts over the life of the truck, for a lower total cost of ownership.

The customer who switched from lead-acid now benefits from fast charging times and zero battery maintenance, which enables operators to spend more time making moves. They also reap productivity-related cost advantages over the life of the truck through faster charging times, reclaiming space for more productive use, and eliminating battery maintenance requirements and hazardous materials protocols.



To compare options and learn more about the most efficient source for your operation, contact your local Hyster® dealer or visit the Hyster website.