



TIME TO RETHINK YOUR LIFT TRUCK POWER

Forklifts depend on strong, reliable power to move materials for manufacturing, pipe in steel operations, crates in agriculture and other payloads in demanding applications. These intense operations have historically depended on internal combustion engines (ICEs) and their consistent power delivery and high performance. But, with the expansion and advancement of electric options like lithium-ion and thin plate pure lead (TPPL), the motive power landscape is shifting.

Lithium-ion batteries in particular are gaining traction when it comes to industrial warehouses and other heavier-duty lift truck applications. Electrification is no longer a pipe dream, as advanced electric power sources are now available on more lift truck models and capacities than ever before, delivering the long-lasting high performance that intensive applications require. While traditional ICE or even lead acid batteries may still be the best fit for some jobs, these advanced electric options make more applications legitimate candidates for electrification than ever — helping overcome common challenges related to sustainability,

productivity, labor efficiency and more. Rather than simply accepting the status quo of lift truck power, it might be time to rethink your power source. This white paper explores four signs it's time to make a change in your materials handling operations.

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Electric is gaining traction in heavier-duty applications. According to [Mordor Intelligence](#), demand for 5-15 ton electric lift truck models is expanding at a 10% compound annual growth rate (CAGR) as advances in high-capacity lithium-ion packs close the performance gap versus diesel.

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1 YOU WANT POWER THAT SUPPORTS YOUR ENVIRONMENTAL VISION

Many businesses have their own green initiatives that seek to reduce fossil fuel emissions, and some state and federal regulations put pressure on industries to reduce environmental impact. From manufacturing to large-scale construction or port operations, this shift puts emissions from powered industrial trucks in the bullseye of sustainability targets.

For managers charged with finding ways to meet those targets, forklifts powered by lithium-ion or TPPL batteries are practical solutions. Neither produces harmful emissions in operation or during charging and they deliver the performance to keep business moving.

2 YOU NEED TO STAY PRODUCTIVE IN THE MOST DEMANDING CONDITIONS

Extreme temperatures, environments and duty cycles can push equipment to the limit, resulting in wear and tear that can lead to a spike in equipment downtime and all kinds of productivity bottlenecks. To manage this risk, operations can explore power sources that are proven to perform in the harshest settings.

ICE lift trucks have been the tried-and-true option for demanding outdoor applications. They offer remarkable durability and have a proven record of standing up to the hottest, dirtiest and coldest environments. These trucks power through multiple shifts without depending on the electrical grid — an especially important consideration if local utilities cannot provide sufficient electricity to keep electric fleets moving.

But electric trucks can handle tough temperatures, too. For example, lithium-ion batteries offer strong performance in hot and cold environments, helping lift trucks run reliably and consistently over multiple shifts, no matter the season. Lithium-ion batteries also consistently offer a level of productivity that is on par with ICE-powered trucks. While lithium-ion batteries deliver full power until they are nearly depleted, lead acid batteries supply diminishing power output as the charge depletes, which means trucks operate below full capacity after a certain point.

Charging complexity and maintenance are also reduced with lithium-ion. Whereas lead acid batteries require equalizing, watering and off gassing, lithium-ion batteries do not involve battery maintenance and can be plugged in without any special

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3 YOU WANT TO REDUCE LABOR STRAIN THROUGH SMARTER ENERGY CHOICES

Lift truck operators are in short supply. With competition so fierce for a limited labor pool, good help is not only difficult to find — it's hard to hang on to, with high employee turnover in manufacturing, warehousing and other logistics sectors. To keep lift truck operators engaged and performing at their best, ergonomics and comfort are key. Electric-powered lift trucks produce less noise than those powered by ICE and transmit fewer vibrations to the operator, offering a smoother ride. Because they do not produce tailpipe emissions, they can also help improve air quality and create a cleaner work environment. Difficulty finding and retaining labor can sometimes force companies to hire forklift operators with little experience. In the case of working with traditional lead acid batteries and liquefied petroleum gas (LPG) tanks, lack of experience can potentially increase safety hazards related to battery handling and charging or LPG tank changing. Unmotivated or fledgling operators may also have poor charging habits, leading to shorter battery life over time for certain battery types.

With a crew of less experienced operators, it's best to have forklifts that are very simple to operate and maintain. The high energy density of lithium-ion supports longer runtimes than lead-acid or TPPL batteries, and lithium-ion batteries do not require handling and changing. They support fast, simple charging without removing the battery from the truck, and allow opportunity charging to top off the charge whenever the truck is idle, which greatly reduces downtime for both the truck and the operator. The time saved on battery maintenance and changing lets businesses make the best use of their operators on hand. Lithium-ion batteries and chargers built by the original equipment manufacturer (OEM) of the lift truck can further simplify ongoing maintenance. Because they are purpose-built for the trucks, OEM batteries and chargers eliminate compatibility risks, and the lift truck dealers can serve as a single source of support for the truck, battery and charger.

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4 YOU WANT TO MAKE SMARTER POWER DECISIONS TO CONTROL COSTS

On average, approximately 80% of the total cost of a forklift comes after the initial capital investment, so it is important to understand how each power source influences lift truck maintenance requirements and energy spend.

All forklifts have some level of planned and unplanned maintenance — whether on a weekly, monthly or quarterly basis. However, ICE forklifts have a whole host of powertrain items that require periodic service or replacement, including fluid, filters, spark plugs, belts or other items prone to wear. Electric powertrains offer greater simplicity and fewer service items, which for some operations can drive thousands of dollars of savings annually through reduced maintenance and parts expenses.

Premature battery failure can also drive up costs. This can be caused by poor charging habits, which can, over time, decrease both battery longevity and capacity. In the case of lead acid batteries, deep discharging and lack of proper maintenance can also cause batteries to fail prematurely.

Most lithium-ion lift truck batteries come with a built-in battery management system (BMS) that monitors cell voltage, temperature and overall battery health while the pack is in operation or charging. Its job is simple: keep the cells inside their safe operating limits, no matter how tough the shift gets. Some lithium-ion batteries — especially those built by the original equipment manufacturer — are designed to communicate directly with the truck and the charger. They push real-time data like voltage, current, temperature, and state of charge back and forth. This tight, digital handshake speeds up charging, keeps the system running smoothly and extends battery life.

Some operations can also achieve significant energy cost savings by switching from LPG or diesel to electric, particularly with the charging efficiency and regenerative braking capability of lithium-ion. For example, one large paper and packaging producer saved \$1.5 million by changing over the fleet in one of their facilities from ICE- to electric-powered forklifts.

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CLEAN POWER MEANS BUSINESS

Advanced electric sources like lithium-ion power started small, powering walkie pallet trucks. But now, lift trucks carrying heavy loads in harsh conditions can be powered by lithium-ion batteries. For demanding applications, counterbalanced lift trucks with integrated lithium-ion power are available from the factory with capacities up to 40,000 pounds and the performance operations expect from an ICE-powered truck.

But to make the best choice when evaluating lift truck power, operations need specialized expertise across the whole range of industrial trucks and available motive power options. An understanding of the unique challenges of your industry is another important piece to making a best-fit recommendation that accounts for the unique characteristics of your operation. The right fit can make fleets more efficient, help retain forklift operators and help reach productivity targets all shift long, day after day.

Could lithium-ion be a more efficient power solution for your forklift fleet? Explore your power options at [Hyster.com](https://www.hyster.com).