



PAYING THE PRICE:

The Real Cost of Changing LPG Tanks

Forklifts powered by liquid propane gas (LPG) used to have advantages in terms of acquisition costs and run times. But market factors such as dramatic swings in LPG costs, demands for better operational efficiency, environmental mandates and even operator health and safety have blunted what used to be advantages of running an LPG-powered forklift fleet.

Financial Considerations: Initial Gain vs. Long-term Pain

In years past, Fleet and Operations Managers often purchased LPG-powered equipment simply because of lower acquisition costs. This was also reinforced by price-conscious Purchasing departments who were responsible for minimizing upfront prices, but weren't necessarily involved with the costs to actually run the equipment after it was in the facility.



But that price-centric model is quickly evolving and many operations now analyze the initial price of equipment along with the costs to operate it over its expected service life. This more comprehensive and accurate analysis is revealing that initial price is a much smaller portion of the total cost of ownership (TCO) than originally anticipated.

This more holistic approach shows that electric equipment efficiency typically eclipses initial price savings on LPG equipment for a few key reasons – starting with maintenance costs. There are simply fewer parts to service or to fail on electric equipment.

LPG and combustion equipment in general requires routine maintenance procedures like oil, coolant and other fluid changes, filter replacements, tuning, emissions checks and other mechanical work. Figures suggest [maintenance for LPG equipment costs up to 40% more per operating hour than electric equivalents](#).

**40% More
Maintenance
Cost with LPG**

In addition, the byproducts of maintaining combustion equipment include contaminated lubricants, fluids and filters, which are often considered to be hazardous materials – costing additional fees for recycling or disposal services to comply with environmental regulations.

As if the offset of savings on maintenance costs weren't enough, volatile energy costs for LPG and other fossil fuels have also made it very difficult for Operations and Fleet Managers. [Propane prices](#) more than doubled from 2020-23 – making it difficult for managers to budget and some cash-constrained operations to afford it. Electricity can cost significantly less than LPG and often has more stable pricing versus LPG and fossil fuels.

Electricity also doesn't usually suffer from supply shortages. Though it is sometimes questioned, the electrical infrastructure is typically reliable. The same hasn't been true recently for LPG, a combination of reduced production in the petrochemical industry and elevated demand has put the supply of propane



itself under stress – affecting the aforementioned pricing and volatility.

The other factor being recognized is the variable nature of maintenance and energy costs. While initial acquisition costs are fixed, energy and maintenance costs vary - increasing as operating hours and age of your fleet equipment increases. Thus, the harder and longer you run your equipment, the more your overall loss on LPG and combustion equipment increases – despite that its original price may have been cheaper.

Efficiency Losses: Propane & People

The other category of costs that are very real and incurred several times per day but are now only being recognized and quantified, are operational costs directly caused by the inefficiencies of exchanging LPG cylinders – including reduced productivity due to lost operator time and cost waste due to unspent LPG fuel.

While many claim changing an LPG tank only takes a few minutes, this is often not grounded in reality. Even if full LPG tanks are available indoors, operators still need to leave their work area during work periods to drive over (or sometimes walk) to the LPG tank exchange area and put on Personal Protective Equipment (PPE). Then operators must remove a hose and unhook clamps to remove the old tank, pull it off the equipment, rack it, then grab a full LPG tank, heft it up onto the equipment, reverse the removal process and then drive back to their work area.

The reality of all this activity happening within the span of a few minutes is doubtful. The reality is that these activities could take up to 10-15 minutes or even more – depending on the proximity of tank exchange to work areas, queue of equipment waiting for an exchange, urgency levels of operators making the exchange and a host of other factors.



Since a typical LPG tank provides roughly 6-8 hours of running time, a tank change every shift is often required. If each change takes roughly 15 minutes, that means every piece of LPG-fueled equipment in a 3-shift operation will be down roughly 45 minutes per day for tank changes.

How large does this amount of downtime become when it gets multiplied across the size of the LPG-fueled fleet and number of operating days per year? Given the burdened hourly rate for your operators and operating costs for your LPG-fueled equipment, how much are these tank changes costing you per year?

The critical difference between electric and combustion equipment is the timeframe in which they are refueled or recharged.

Combustion equipment, due to the nature of when LPG tanks run low, must be attended to during actual working periods – meaning productivity is entirely lost during tank changes. In contrast, electric equipment can be “opportunity-charged” during brief, scheduled intervals when the equipment isn’t being used – such as during work breaks or between shifts. This means recharging of electric equipment can be accomplished with little to no effect on productivity, as it happens when the facility is idle anyway.

Battery and charger technology has advanced to a point where it can support almost any operation wishing to move to electric using this opportunity-based charging scenario. There are a range of options that can fit operations – ranging from traditional lead-acid batteries adapted for “fast charge” or more advanced technologies such as thin plate pure lead (TPPL) and lithium-ion batteries designed specifically for opportunity charging applications.

Differing from most refueling methods, the tank-changing model of LPG also wastes fuel. For example, when your car runs low on fuel, or when batteries have a partial charge, they are still storing that unspent portion of energy. When you

refuel your car or recharge a battery the new fuel or charge simply gets added to the portion that was remaining. But exchanging LPG cylinders does not work in this same fashion and creates inherent waste because, unless the operator runs the equipment entirely out of fuel, there is still LPG remaining in the tank at the time of exchange.

In most tank exchange programs, any unspent fuel remaining in used cylinders goes back to the fuel supplier and is neither checked nor credited back to the customer – so your operation could be repeatedly paying for fuel it never gets to use. Depending on how many cylinders your operations are using, these costs could really add up.



The typical forklift LPG tank holds 8 gallons. Even if operators are driving equipment down to only 1/8th of a tank remaining, a full gallon of LPG remains when it’s exchanged – roughly a 12.5% loss. In that same 3-shift application mentioned earlier, that equates to 3 lost gallons of LPG per day.

Similar to the earlier calculations of downtime cost, how large does this LPG waste become when it gets multiplied across the size of your fleet and number of operating days per year? Given your cost per gallon, how much is 12.5% of LPG waste costing you per year?

Paying the Price over the Long-term

While accounting for TCO is complex and specific to your particular operation, evaluating equipment solely based on its initial price tag is risky. Saving on initial acquisition cost almost always feels good, but your operation will have to live with the effects of your decision for the lifetime of that new equipment - several years after those initial savings have been overtaken by operational costs and inefficiencies.

How will your operation look 3-5 years in the future, in terms of pressures on efficiency? Which direction will operating costs trend over that period - less or more expensive? What will happen if you choose LPG and those energy, maintenance and labor costs continue to rise enough to exceed your budget forecasts?



These are the questions savvy Fleet and Operations Managers are beginning to ask themselves when they evaluate new equipment and how it will be powered. They understand electric equipment now offers efficiencies and value based on real operational requirements. They also understand that new maintenance-free battery technologies can reduce their downtime and TCO while simultaneously providing equivalent performance to their traditional LPG equipment.

Convert with the Right Partner

Successfully converting from combustion to electric equipment requires a partner with experience, analysis capabilities and a broad range of battery and charging technologies. Working with a vendor who resorts to guesswork on your power system or only offers one or two technologies jeopardizes both your conversion and subsequent operations.

This is why many Operations and Fleet Managers trust EnerSys® with their

conversion to electric equipment. As an industry leader in material handling power systems, they offer decades of experience with electric conversions – using data and analytical tools to optimize your system across the broadest range of battery technologies.

If you're ready to take a more comprehensive, long-term look at your fleet's power, EnerSys® can help you minimize conversion risk and find an optimal solution for today, and tomorrow.



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