

Electric vs. LP Gas Lift Truck Cost Comparison

"What should I use, LP gas or electric lift trucks?" Many fleet managers ask us this question. There is no "right" answer as a rule of thumb. There are just too many variables to give a pat answer. Recently, the question was posed to us once again and we decided to perform an 'ACTUAL CASE STUDY" that captures the variables and quantifies the answer.

In this white paper the information is presented in a "fixed" form illustrating a single example from our fleet analysis files. The electric costs were taken from actual customer bills, as were the Liquid Propane fuel costs. The maintenance costs were based on existing full-service maintenance contracts.

In order to isolate electric fuel (charging) costs (there was no meter in the battery charging line) we did the following:

- Our client totaled all electric lift truck hours used by month for the entire year (six months of the year the client has an elevated level of equipment use).
- Our client matched kilowatt-hours used by month.
- We then calculated the delta in elevated kilowatt usage due directly to the increased lift truck usage.
- We divided the average number of excess kilowatt-hours by the number of excess lift truck hours to estimate the number of kilowatt hours used for each lift truck hour of operation.

The batteries in the study were flooded flat panel lead batteries used in 5,000 lb lift trucks. We understand that tubular panels and "absorbed electrolyte" technologies show considerable reductions in charging costs and we look forward to studying them ourselves in the future.

In this study, we estimated that it took 23.5 KW's hours to charge the batteries for each hour of run time. At the average rate being charged to our client, we estimated that it costs approximately \$1.48 per hour of operation to charge their batteries.

There are other overhead considerations for battery use – specifically a charging bay, chargers and equipment to remove and move (3,000 lb) batteries. The overhead in this example is spread over 33 lift trucks forcing the Cost Per Hour (CPH) down to \$.23 per hour (15,000 hours of useful life for each lift truck). If you had to install the same equipment for only one lift truck, it would cost approximately \$1.65 per hour of operation. The important point to remember is that there is NO additional equipment to purchase for IC (Internal Combustion) trucks.

Here is a look at the battery overhead needed.

ltem		ct. Detail Calcs	Т	otal	Cost Per Hour	LP Gas Detail Calcs	LP Trk Total Costs	Cost Per Hour
item		Caics	_ C	osts	nour	Caics	Costs	nour
Battery Maintenance								
Battery Charger	\$	1,800	\$	1,800				
Battery Washer	\$	8,000	\$	8,000				
Battery Gantry & Racking	\$	10,000	\$ 1	10,000				
Cost of Battery Maint Equipment			\$ 1	19,800				
Life in months		60						
Internal "hurdle" rate		8.0%						
Residual Value		0.0%						
Monthly Depreciation / "Pmt"	\$401.47							
Total Cost of Batt Maint Equipment	\$	24,088						
Maint Employee Rate per hr	\$	15.00						
Time to changeout and clean a battery -								
minutes per day		10						
Total Battery Days from B20 & B21 above		2,500						
Total Employee Cost			. \$	625				
Total Batt Maint Cost and Per Hour			\$ 2	24,713	\$1.65		\$ -	\$0.00

The LP gas charges were taken directly from customer bills. The only equipment using LP gas were the lift trucks being studied so we did not have to isolate the fuel costs for LP. The market price for LP in the area was \$1.35 per gallon. Your price may vary especially with energy / fuel charges constantly changing. The interesting thing to note here is that "fuel" cost is NOT the item that creates the big disparity of cost on the bottom line.

It would be fascinating to track costs for two identical fleets of lift trucks used in identical applications, tracking all costs from purchase price to "fuel" consumption, maintenance, repair, and tire cost. It would take several years, and could be very volatile due things like oil shortages or power rate volatilities.

The side-by-side cost comparison for the useful economic life of a 5,000 lb capacity electric forklift truck with no attachments and the same truck using LP Gas is on the following page.

	Elect. Detail	Elec Trk Total	Cost Per	LP Gas Detail	LP Trk	Cost Per
ltem	Calcs	Costs	Hour	Calcs	Total Costs	Hour
Truck Cost	¢ 24,000			¢ 40,000		
Basic 5,000 Lb Lift Truck with straight forks	\$ 24,000			\$ 18,000		
Total Hrs of Truck useful economic life	15,000			15,000		
Total Days of Truck life @ 6 hrs per day	2,500			2,500		
Working Shifts per Month	22			22		
Total Truck life in Months	114			114		
Internal "hurdle" rate	8.0%			8.0%		
Residual Value	20.0%			20.0%		
Monthly Depreciation / "Pmt"	\$ 272.99			\$ 204.74		
Total Lift Truck Cost and Per Hour		\$ 31,120	\$ 2.07		\$ 23,340	\$ 1.56
Batteries "gas tanks" Cost						
Hrs of battery use per day (not per shift)	6					
Total hrs of battery life	4,500					
Total Days of battery life	750					
Total batteries required	3					
Cost per Battery	\$ 3,500					
Total Cost of Bateries	\$ 11,667					
Life in months	36					
Internal "hurdle" rate	8.0%					
Residual Value	0.0% \$365.59					
Monthly Depreciation / "Pmt"	 \$303.39					
Total Battery Cost and Per Hour		\$ 13,161	\$ 0.88		\$ -	\$ -
Lift Truck Maintenance						
Current quotes from local vendors						
Hrs per month Cost per month	250 \$350			250 \$420		
Cost per month Maximum hours under contract	15,000			15,000		
Total Maint Cost and Per Hour	10,000	\$ 21,000	\$ 1.40	10,000	\$ 25,200	\$ 1.68
Electric Fuel Cost Total Charging KW/s for paried	42.062					
Total Charging KW's for period Cost per KW	42,863 \$0.0632					
Total Power Cost	\$2,710.29					
Total Hours of Lift Truck Op. for period	1,826					
Total Electrical Cost and per hour		\$ 22,260	\$ 1.48			\$ -
Propane Fuel Cost						
Fuel usage per hour in gals				1.0459		
Propane cost per gallon				\$1.350	_	
Total Electrical Cost and per hour					\$ 21,179	\$ 1.41
Total Life Cost of Ownership and						•
Operations and Per Hour		\$ 87,542	\$ 5.84		\$ 69,720	\$ 4.65
Add back residual value		\$ 4,800			\$ 3,600	
Net Total Cost		\$ 82,742	\$ 5.52		\$ 66,120	\$ 4.41
Number of Trucks in Fleet	33			Per Unit	\$ 16.622	\$ 1.11
Number of Trucks in Fleet				i ci ciiit	Ψ 10,022	Ψιιι

As you can see in this example, LP Gas units are considerably less expensive to own and operate. Notice that with electric trucks that you must purchase several additional "fuel tanks" (batteries) as well as pay a premium for the basic equipment (\$24,000 for electric vs. \$18,000 for gas). It is interesting that many would assume from conversations with those in the industry that electric trucks cost considerably less to operate and maintain. However, in this case, it doesn't appear to be true.

It was also interesting to discover that the electric "fuel" costs in this study - \$1.48 per hour of run time for electricity were more than the \$1.41 per hour for LP Gas. This was a surprising finding since we had heard that battery charging costs were miniscule. We believe that a more accurate explanation is that charging costs are "hidden" in facilities operating costs. When actually captured (by our method or a separate meter for the charging circuit), the "fuel" costs will reflect a surprising and more accurate amount.

The overall cost difference in this comparison was approximately \$16,622 per unit (\$82,742 for electric minus \$66,120 for gas) or \$1.11 per hour of operation during its useful economic life (not including the battery maintenance overhead). That means for every 4 electric lift trucks, this customer could have owned and operated 5 LP Gas trucks. In our opinion and all other operating variables being equal, we think it would be a better value for this client to use LP gas trucks rather than electric.

THAT BEING SAID, we understand that there are many other mitigating circumstances governing your decision – things like flammable conditions requiring EE equipment, emissions issues (smell), local equipment availability, lease vs. buy strategies and so on. There are many variables to consider, but having considered them in this case, the results are compelling.

Note: The comparison "tool" is available for your own analysis. Please send your enquiries to **info@LDBailey.com**.

LD Bailey & Associates has extensive industry experience in tangible asset management, financial analysis, business strategy development, and management technologies. LDB specializes in the areas of equipment finance, fleet maintenance and management, cost and telemetry reporting, and has experience in safety compliance. In addition, LD Bailey's staff also includes experts in load logistics and black-box telemetry systems. It is their sole purpose to find hidden dollars for clients in the acquisition, maintenance, operation and liquidation of capital and operating assets.