



FAST CHARGE VS MULTIBATTERY OPERATION FEASIBILITY ANALYSIS REPORT

MANUFACTURING COMPANY

48V FAST CHARGE

CONVERSION VS MULTIPLE BATTERY OPERATION

7 Vehicles

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Vehicle Analysis

LIFT TRUCK 48V

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Overview

In this report the we analyze the battery/charging sizing and cost of a Fast Charge Single Battery Proposal vs the current Multiple Battery operation.

The Feasibility report shows the shift schedule and daily use of the site in comparison to the chosen charger and battery. Showcasing the ability to keep up with the demand of the site.

The Financial report inputs the initial equipment cost, the maintenance cost, energy cost, and any other cost associated. breaking it down over a 48 month lease period. All custom inputs based on the product and the end users inputs.

Not show, but most important is the non quantifiable safety cost. Single battery operation removes the need for battery changing. Resulting in a safer workplace free of potential falling batteries and spills. Operators just need to plug up.



LIFT TRUCK 48V

Voltage: 48V Quantity: 7

ENERGY

	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Scheduled hours	21.50	21.00	21.50	21.50	21.00	21.50	21.50
Adjusted hours	8.57	8.57	8.57	8.57	8.57	8.57	8.57
Charging hours	2.50	3.00	2.50	2.50	3.00	2.50	2.50
Idle hours	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scheduled Avg. Amps per running hours	55.81	33.33	55.81	55.81	33.33	55.81	55.81
Adjusted Avg. Amps per running hours	140.00	81.67	140.00	140.00	81.67	140.00	140.00

Above shows the operation time, charge time, and amp hrs per hr. This is determined for each site through data collection and input from the end users.

SCHEDULE

Mon. Wed. Thu. Sat. Sun.

SHIFT 1 (7:00 am - 7:00 pm)

Charge Time	Idle Time
07:00 - 07:15	09:30 - 09:45
12:45 - 13:15	16:00 - 16:15

SHIFT 2 (7:00 pm - 7:00 am)

Charge Time	Idle Time
19:00 - 19:15	22:00 - 22:15
00:45 - 01:15	04:00 - 04:15

Tue. Fri.

SHIFT 1 (7:00 am - 7:00 pm)

Charge Time	Idle Time
07:00 - 07:30	10:00 - 10:15
12:45 - 13:15	16:00 - 16:15

SHIFT 2 (7:00 pm - 7:00 am)

Charge Time	Idle Time
19:00 - 19:30	22:00 - 22:15
00:45 - 01:15	04:00 - 04:15

Above shows the end users shift schedule and allotted charge times. Determined from input from the customer.

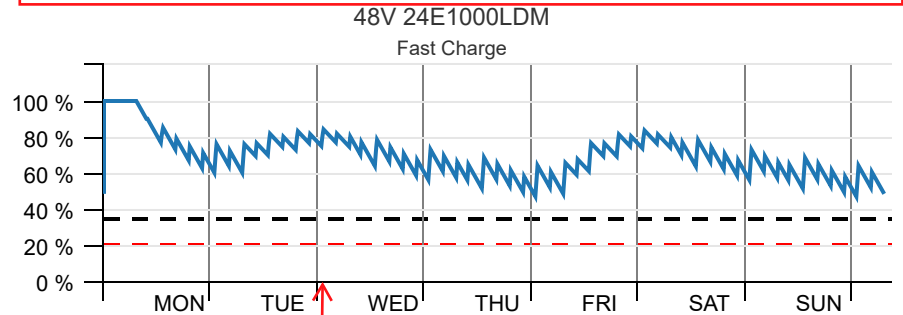
To the right we see the total daily capacity of the batteries selected and the percentage of that daily capacity used in operation. Above 100% results in overuse and warranty will not be accepted.

FEASIBILITY ANALYSIS REPORT

STATE OF CHARGE

Use	Charger	Max. Current at 48V	Max. battery accepts at 1000 Ah	Effective Start Rate	Min. SOC
0	LSM3-48L-360YP	360 A	450 A	36%	47%
0	Inadequate (SOC < 20%)	0	Marginal (SOC between 20-35%)	0	Optimized (SOC > 35%)

Above is the charger selected. It shows the current output of the charger and the percentage that the battery can accept.

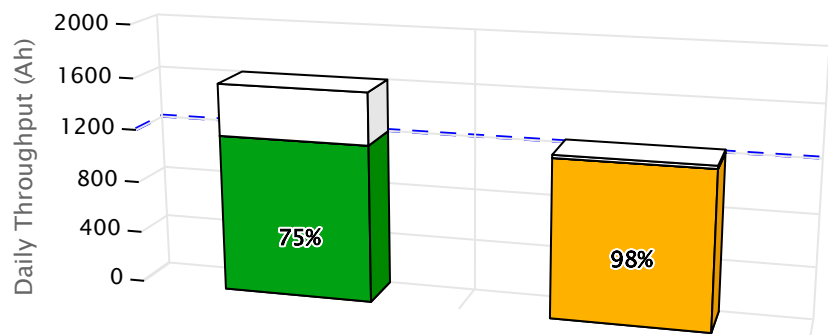


State of charge throughout a high use work week. showing if the battery and charger can keep up with the work load at this site. We want to see it maintain above 40% below 20% is over discharging.

BATTERY ANALYSIS

Make	Series	Model	Ah	kWh	Warranty Daily Limit (%)
HAWKER	ENERGYPLUS	48V 24E1000LDM	1000	48.0	160
HAWKER	POWERLINE	48V 24-85F-19LDM	765	36.7	160

--- Daily Throughput



BATTERY	24E1000LDM	24-85F-19LDM
MAX. DAILY USAGE 1200 Ah	75%	98%
CAPACITY	1600 Ah	1224 Ah



LIFT TRUCK 48V

FINANCIAL REPORT

Proposed Fast Charge Solution vs Current 2 Battery operation with battery changing. Broken down into equipment cost, energy cost, maintenance cost, and additional cost related to safety.

APPLICATION ANALYSIS

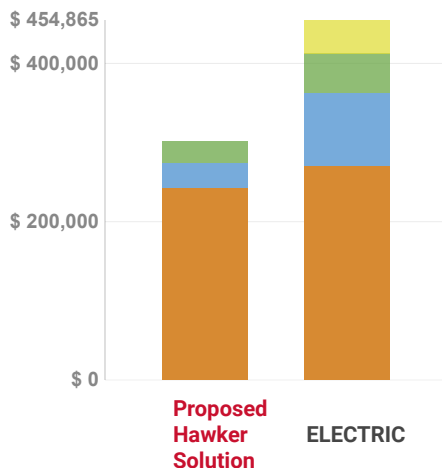
Vehicle Load Capacity:	4500-6499 Lbs.
Days of operation:	350
Weekly energy required:	342.77 Battery kWh
Battery model:	24E1000LDM
Batteries per vehicle:	1
Charging methodology:	FAST CHARGE
# of Vehicles:	7

FINANCIAL METHOD

	PROPOSED HAWKER SOLUTION	ELECTRIC
VEHICLE	LEASE 12 Months 0%	LEASE 12 Months 0%
BATTERY	LEASE 48 Months 8%	LEASE 48 Months 8%
CHARGER	LEASE 48 Months 8%	LEASE 48 Months 8%

Lease period and rate.

FIVE YEAR COST COMPARISON

OPERATING COST
SUMMARYProposed Hawker
Solution

ELECTRIC

INITIAL INVESTMENT SUMMARY
PROJECT

\$ 0.00

\$ 0.00

EQUIPMENT INVESTMENT SUMMARY
ANNUAL / PROJECT

\$ 48,646.08

\$ 54,170.76

FUEL / ENERGY EXPENSE
ANNUAL / PROJECT

\$ 6,177.15

\$ 18,427.18

MAINTENANCE EXPENSE
ANNUAL / PROJECT

\$ 5,425.00

\$ 9,975.00

ADDITIONAL EXPENSES
ANNUAL / PROJECT

\$ 0.00

\$ 8,400.00

TOTAL:

\$ 60,248.23

\$ 90,972.94

DETAILS | Annual / Project

Proposed
Hawker Solution

ELECTRIC

INITIAL INVESTMENT SUMMARY

No Upfront Costs Available

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TOTAL:

\$ 0.00

\$ 0.00

LEASE/FINANCE SUMMARY

\$ 48,646.08

\$ 54,170.76

Vehicle Model #: EC25EN

Default

Vehicle Price: \$ 0.00

\$ 0.00

Vehicle Annual Payment: \$ 0.00

\$ 0.00

Battery Price: \$ 101,185.00

\$ 78,400.00

Battery Annual Payment: \$ 27,488.16

\$ 42,596.40

Charger Price: \$ 81,060.00

\$ 44,345.00

Charger Annual Payment: \$ 21,157.92

\$ 11,574.36

FUEL / ENERGY EXPENSE

\$ 6,177.15

\$ 18,427.18

Fuel Cost: \$ 0.04 per Battery kWh

\$ 0.04 per Battery kWh

Battery Change: 0 min.

12 min

Changes Per Day: 0

1

Labor Rate (Cost per hour): \$ 25.00 per hrs

\$ 25.00 per hrs

MAINTENANCE EXPENSE

\$ 5,425.00

\$ 9,975.00

Annual hours of usage: 3000 hrs.

3000 hrs.

Vehicle Maintenance (Per Hour): \$ 0.00

\$ 0.00

Vehicle cost for PM: \$ 0.00

\$ 0.00

Batteries per vehicle: 1 Batteries

2 Batteries

Battery Maintenance (Per Battery): \$ 400.00

\$ 400.00

Watering program (Per Battery): \$ 250.00

\$ 250.00

Charger Maintenance: \$ 125.00

\$ 125.00

ADDITIONAL EXPENSES

\$ 0.00

\$ 8,400.00

Operator Safety: \$ 0.00

\$ 8,400.00

TOTAL:

\$ 60,248.23

\$ 90,972.94

Initial cost is the cost of the batteries and chargers. The proposed solution utilizes half the number of batteries. Energy cost is the end users electric rate including labor for battery changing. Maintenance costs consist of pms, repairs, and watering. Resulting in a 34% savings or 30K difference. Additional space and equipment is saved without the need of changing areas and equipment.