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# Moving a lift truck fleet from flooded lead acid batteries to NexSys® TPPL (Thin Plate Pure Lead) technology

## Case Summary

Faced with high lift truck battery maintenance requirements and operating costs, a leading flexible polyurethane foam manufacturer sought a less labor-intensive and more cost-effective solution. Following a power study from EnerSys®, the manufacturer started switching its lift truck fleet from flooded lead acid batteries to NexSys® TPPL (Thin Plate Pure Lead) batteries. With its move to TPPL, the company is on track to save up to \$42,000 annually, resulting in potential savings of up to \$168,000 over four years.

## Customer background and situation

Based on the East coast, this polyurethane foam manufacturer operates plants across North America and Europe. The company's product applications range from home furnishings and carpets to consumer goods. Supporting product distribution in North America is a fleet of nearly 600 Toyota sit down lift trucks.

In 2018, flooded lead acid batteries were powering the company's entire lift truck fleet. While quite effective in terms of supplying the required amp hours (Ah), the batteries had significant maintenance demands that were driving labor and operating costs. The company's battery and charger dealer, Industrial Battery & Charger, Inc., suggested that a power study conducted by EnerSys® would likely reveal a lower-maintenance battery solution with a lower Total Cost of Ownership (TCO). Company management agreed, and gave its operations team the go-ahead to work with EnerSys® to collect the necessary operating data – see **Exhibit 1**.

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Application Information

- Distribution sites – 30 locations
- Shift details – 3 shifts
- Days per week – five or six
- Days per year – 260

Lift Truck Information

- Total trucks in fleet – 598
- Annual truck hours – 2,000
- Amp hour (Ah) consumption per day – 360-680
- Amp hour (Ah) consumption per hour – 45

## **EnSite™ Modeling Software Feasibility and Project Financial Report**

EnerSys® entered the data into its proprietary EnSite™ modeling software. The EnSite™ software applies an end-user’s specific operating parameters and power requirements to generate reports that compare battery chemistries and identify the battery solution with the lowest TCO.

EnSite™ software also provides a battery performance review that helps end-users define key operational challenges. The review indicated that battery maintenance-related issues were driving operating costs. Flooded lead acid batteries require watering at regular intervals, a task for which the company was allocating additional employee hours. Poor watering practices were causing \$3,000 of acid damage to watering system parts per year, diverting even more maintenance hours to battery and spill clean-ups and limiting battery lifecycle performance. Improper battery equalization charging practices were also contributing to shorter battery lifecycles.

After weighing all of the company’s operational variables and challenges, the EnSite™ software produced a Feasibility Report that recommended a switch from flooded lead acid batteries to NexSys® TPPL batteries. In large part, it was because TPPL batteries do not require watering and can be fast- and opportunity-charged, making them well suited for use in multi-shift operations. The EnSite™ software also generated a Project Financial Report outlining potential Return on Investment (ROI) plus annual and four-year savings (see **Exhibit 2**).

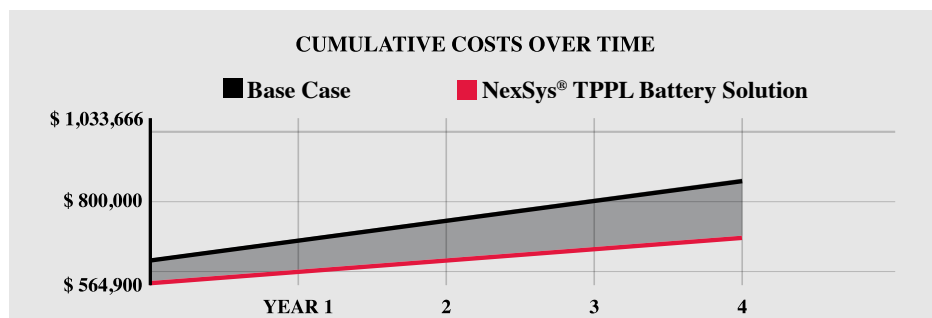
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## Exhibit 2 Projected Return on Investment

	<b>NexSys® TPPL Battery Solution</b>	<b>Base Case</b>	
Equipment Investment Summary ANNUAL	\$141,224.40	\$159,984.00	- <b>\$18,759.60</b>
Maintenance Expense ANNUAL	\$4,440.00	\$24,720.00	- <b>\$20,280.00</b>
Additional Expenses* ANNUAL	\$0.00	\$2,999.00	- <b>\$2,999.00</b>
<b>Total Annual Benefit</b>			<b>\$42,038.60</b>
Timeline for ROI**			<b>Immediate</b>
Projected Savings Over Four Years			<b>\$168,149.95</b>

\* Additional expenses represent current operational expenses as identified and outlined by the customer represented in this case study and are not the responsibility of EnerSys®.

\*\*Savings apply solely to the customer represented in this case study. Immediate results are not guaranteed and subject to change. ROI results are based on specific customer provided data.



## TPPL Battery Implementation

Convinced by the EnSite™ software projected savings and the clear advantages of TPPL technology, the company placed its first order for NexSys® TPPL batteries – 231 battery units supported by 231 chargers. The TPPL batteries would be used in five facilities across the United States. To help ensure their success at each location, representatives from Industrial Battery & Charger, Inc. and the lift truck dealer, Southeast Industrial Equipment, conducted onsite training sessions at all five sites.

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## Case Conclusion

By January 2020, the company was powering its full fleet of 598 lift trucks in the five facilities. Thanks to the company's ongoing switch from flooded lead acid batteries to NexSys® TPPL batteries, its lift truck operators are moving away from the need to water batteries, clean spills, and for batteries to complete long equalization charges. According to battery operating data collected at the time of this writing, the TPPL batteries are expected to deliver a savings projected by the EnSite™ software Feasibility and Project Financial Report of up to \$42,000 annually and \$168,000 over four years. The company plans to switch the rest of its 598-vehicle lift truck fleet from flooded lead acid batteries to NexSys® TPPL batteries by the end of 2022.