

## **Solutions for Electric Vehicle Batteries at End-of-Life**

*Remanufacturing can lead to a 25% reduction in demand for new batteries*

**San José, Calif., September 12, 2016** – Growth in vehicle electrification has increased the use of lithium-ion batteries for energy storage, and raised the issue of what to do with post-vehicle-application batteries. New research recently released by the [Mineta National Transit Research Consortium](#) identifies methods to improve the post-vehicle-application use of electric vehicle batteries. The report, [Advances in Repurposing and Recycling of Post-Vehicle-Application Lithium-Ion Batteries](#), conducted by researchers Charles R. Standridge, PhD, Lindsay Corneal, PhD, and Nicholas Baine, PhD identify three possibilities: 1) remanufacturing for intended reuse in vehicles; 2) repurposing for non-vehicle, stationary storage applications; and 3) recycling, extracting the precious metals, chemicals and other byproducts.

This research presents a comprehensive mathematical model to assess remanufacturing, repurposing, and recycling production capacity, as well as new battery production capacity, given any forecast of the number of electric vehicles and plug-in hybrid electric vehicles through the year 2030. Results from the model provide needed capacity for the percent of post-vehicle-application batteries that are remanufactured. According to Dr. Standridge, “a full commitment to post-vehicle-application battery remanufacturing will lead to a 25% reduction in demand for new batteries. This is a great achievement keeping in mind the environmental impact of the manufacturing process for new batteries.”

The research team also conducted a demonstration project with Hastings Township, MI to showcase advances in lithium-ion battery repurposing. A prototype energy storage and management system was constructed to support a mobile, off-grid battery recycling system.

Another focus concerned the challenges associated with recycling lithium-ion batteries from different manufacturers where the active materials vary in composition. The researchers used acid baths to successfully separate out the active material coatings from batteries of varying chemistries from three different manufacturers. Tests prove that complete separation of active material is possible through this process at relatively low temperatures, low acid concentrations, and in a short time frame which should improve and reduce the overall cost of recycling in the future.

The full report can be downloaded at no charge from the Mineta Transportation Institute web site: <http://transweb.sjsu.edu/project/1238.html>

### **ABOUT THE RESEARCH TEAM**

Dr. Charles R. Standridge is the Associate Dean of the Seymour and Esther Padnos College of Engineering and Computing at Grand Valley State University, in Grand Rapids, MI. Dr. Lindsay Corneal and Dr. Nicholas Baine are assistant professors in the School of Engineering at Grand Valley State University.

### **ABOUT THE MINETA NATIONAL TRANSIT RESEARCH CONSORTIUM**

The Mineta National Transit Research Consortium (MNTRC) is composed of nine university transportation centers led by the Mineta Transportation Institute at San José State University.

The Consortium was organized in January 2012 after winning a competition sponsored by the US Department of Transportation (DOT) to create consortia tasked with “Delivering Solutions that Improve Public Transportation.” Member universities include Bowling Green State University, Grand Valley State University, Howard University, Penn State, Rutgers University, San José State University, University of Detroit Mercy, University of Nevada Las Vegas, and University of Toledo. Visit [transweb.sjsu.edu/mntrc](http://transweb.sjsu.edu/mntrc)

#### **ABOUT THE MINETA TRANSPORTATION INSTITUTE**

The Mineta Transportation Institute (MTI) at San José State University conducts independent, internationally recognized research and technology transfer in surface transportation policy and practice, along with transportation education and workforce development. Our mission is to increase mobility for all by improving the safety, efficiency, accessibility, and convenience of our nation’s transportation system. The Institute is funded through the US Department of Transportation, the US Department of Homeland Security, the California Department of Transportation, and public and private grants. Visit [transweb.sjsu.edu](http://transweb.sjsu.edu)

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