Second Life Demonstration

TENNESSEE

PROJECT NAME: Second-life Battery in Mobile EV Charging Application for Rural Transportation (SMART)

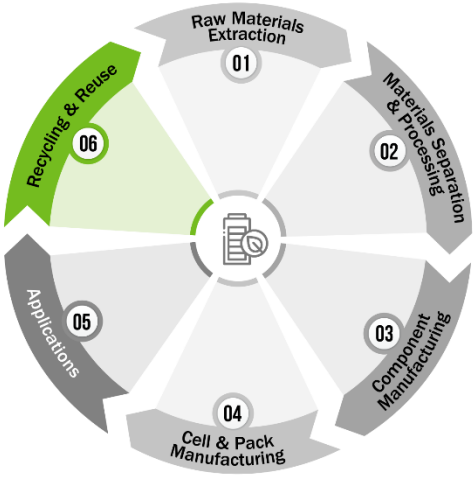
Tennessee TECH

APPLICANT: Tennessee Technological University (Cookeville, TN)

Federal Cost Share: $4,531,642

Recipient Cost Share: $4,532,323

Supply Chain Segment: Recycling



Project Description:
Mobile charging stations (MCSs) play a critical role in removing the charging deserts in rural areas and alleviating range anxiety, as they can be transported to desired locations for EV charging with fewer concerns about power infrastructure and locational constraints. While rural America will potentially need many MCSs to eliminate charging deserts, the high investment cost due to large and new battery energy storage systems (BESS) and low utilization rate are barriers to adoption at a large scale. The requirement of large and new BESS in MCSs also
burdens the U.S. battery supply chain.

This project aims to address the urgent need to develop affordable MCSs that can be deployed in rural America on a large scale by utilizing second-life batteries retired from EVs. The project objectives are to 1) design, develop, demonstrate, and validate four types of cost-effective MCSs to reduce upfront investment costs; 2) create and demonstrate first-of-the-kind affordable, resilient, and sustainable rural EV infrastructure in a multi-state region (TN, OH, VA, KY, WV, KS, and TX) by seamlessly integrating affordable MCSs into the existing charging network to support electrification in underserved rural communities; 3) collect and analyze the first-hand data of second-life-battery-integrated MCSs to assess the potential market and benefits; 4) create outreach, training, and education opportunities to help a broad range of EV stakeholders make informed decisions in adopting second-life-battery-powered MCSs and develop economically viable charging stations.

The project team consists of one major EV original equipment manufacturer (Nissan North America), two MCS suppliers (BoxPower and FreeWire), one second-life BESS diagnostic company (ReJoule), one battery material recycling company (Princeton NuEnergy), four academic institutions (Tennessee Technological University, University of Texas-Austin, University of Kansas, and University of Memphis), Pacific Northwest National Laboratory, and two DOE Clean Cities coalitions (East Tennessee Clean Fuels Coalition and Virginia Clean Cities), three State Energy Offices (Tennessee Department of Environment and Conservation, Kentucky Office of Energy Policy, Texas State Energy Conservation Office), a top-ranked engineering, procurement, construction provider (Black & Veatch), and Twinify Technologies.