



U.S. Department of Transportation
Federal Transit Administration



Bus Exportable Power Supply (BEPS) System Use Strategy: Investigating the Use of Transit Buses as Emergency Generators

Background

In recent years, natural disasters have devastated cities and communities across the US. Hurricanes, flooding, wildfires, and other incidents result in power outages that hinder emergency response and rescue efforts. During Hurricane Maria in 2017 that impacted Puerto Rico and the US Virgin Islands, the Federal Emergency Management Agency (FEMA) dispatched 250–300 generators from its inventory. Responders supplemented them by leasing/renting an additional 1,150 generators to augment the shortfall in generator requirements, but this still was not enough.

The Center for Transportation and the Environment (CTE) partnered with the University of Texas Center for Electromechanics and Hagerty Consulting to develop a Bus Exportable Power Supply (BEPS) System that will give hybrid buses the capability to act as on-demand, mobile electrical-power generators. This technology will be especially useful in emergency disaster response and recovery when traditional power supplies are not reliable.

Objectives

The objectives for this project were to identify the need for backup power during an emergency or disaster, determine the technical and logistical capabilities to transform a hybrid bus into a mobile generator, create a component that facilitates the conversion of a hybrid electric bus into a backup power generator, demonstrate the bus generator's capabilities through a controlled simulation, investigate the value a BEPS-equipped bus adds during an emergency, describe the most plausible, best-use option for the BEPS technology, predict obstacles upon introducing BEPS technology, determine procurement, operation, and ownership options for the BEPS system, and theorize potential next steps for the BEPS system upon its actualization.

Findings and Conclusions

Buses equipped with exportable power systems can make communities more resilient to emergency events and make local municipalities less dependent on State and Federal resources during disaster response and recovery.

A panel of experts provided subject matter expertise across multiple industries on aspects related to the development and utilization of BEPS, including representatives from transit agencies, emergency management agencies, private sector partners, the American Red Cross, the National Guard, and USACE.

To test the efficacy of the BEPS system prototype, a demonstration was performed on January 30, 2018. The BEPS was able to power up seamlessly and follow the facility loads, even with an unbalanced load on the three-phase connection with the test facility. Results from the demonstration proved that exportable power from a bus could be used to power a facility in a power outage event.

In most local jurisdictions, the emergency management agency and the transit agency have established relationships because the transit agency assists with moving citizens during evacuations. The use of BEPS could build off this relationship to give transit agencies the additional role in emergencies of providing back-up power. However, for these systems to become a reality, bus manufacturers, along with state and federal agencies, must commit resources to system design and development, and their customers (e.g., transit agencies) must express a desire to add the technology to its fleet.

Benefits

The intrinsic value of BEPS lies in its ability to simplify and expedite the resource deployment process for backup power. Having the BEPS component added to the bus eliminates the need to procure a separate generator to power those facilities most critical to disaster response and recovery. Stakeholders agree that buses equipped with exportable power systems can make communities more resilient to emergency events and make local municipalities less dependent on State and Federal resources during disaster response and recovery.

Project Information

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This project was conducted by Jason Hanlin of the Center for Transportation and the Environment with support from Michael Lewis at the University of Texas–Center for Electromechanics and Ashley Wargo of Hagerty Consulting. For more information, contact FTA Project Manager Samuel Yimer at (202) 366-1321, Samuel.Yimer@dot.gov. All research reports can be found at <https://www.transit.dot.gov/about/research-innovation>.