Electric Buses: Lessons from Early Adopters

The Infrastructure Investment and Jobs Act (IIJA) expanded competitive federal funding for low and no emission buses six-fold to more than $1.1 billion annually through 2026. An additional $1 billion annually in formula and competitive grants are available for upgrades to bus facilities, making it easier than ever for cities to make infrastructure improvements needed for fleet electrification. This historic investment will provide assistance for 150 bus fleets and facilities to reduce air pollution, carbon dioxide emissions, and noise produced by buses.

On Wednesday, March 15, the Tech and Innovation Center Series of the Local Infrastructure Hub hosted a webinar to bring together experts from two U.S. cities already on their bus electrification journey—Honolulu and Charlotte—with transit leaders preparing responses to the current funding opportunity and exploring participation in 2024 and beyond.

Among the highlights of the discussion:

- **Roger Morton, Director, Department of Transportation Services, City and County of Honolulu, Hawaii** shared highlights and lessons from his city's three-decade bus electrification journey. Beginning in 1993, local transit officials partnered with the U.S. Department of Defense's DARPA innovation agency to deploy one of the first hybrid electric buses anywhere in the world. In 2006, the city purchased its first commercial hybrid-electric vehicles, and started a rapid fleet expansion using battery-electric buses (BEBs) in 2019 with funding from the Low and No Emission Buses program. The biggest surprise along the way? Early estimates of inferior range, and the need for up to 30 percent more vehicles to maintain existing levels of service, have not come to pass. With smart scheduling that helps pull electric buses off the road mid-day for charging, BEBs are able to drive an average of 159 miles per day, 35% more than their diesel equivalents typically drive today.
- **Catherine Kummer, Sustainability, Resiliency and Governmental Affairs Officer for the City of Charlotte, North Carolina** talked about the Charlotte Area Transit System's ongoing 18-month electric bus pilot, also funded through the Low or No Emission Buses program, and an integral part of the agency's transition commitment to a 100 percent zero-carbon bus system by 2030. While battery-electric buses are a key part of the city's strategy, following a pivot away from compressed natural gas vehicles in 2019, zero-emission fuels like hydrogen are still very much on the table in a region where renewable sources of electricity aren't yet as abundant.

Key Lessons for Cities

1. **Plan Ahead for Infrastructure Upgrades.** Buying new vehicles takes a year from solicitation to delivery. But building out charging stations can take 3 years or more and involve cultivating multiple intra- and inter-governmental partnerships, as well those with equipment vendors and utilities. Costs are a big hurdle too, which is why Honolulu is exploring the feasibility of siting electric substations at charging points on city-owned property to make them eligible for federal cost-sharing.
2. **Expect An Adjustment Period.** Everyone—from drivers to passengers to maintenance teams—will need time to adjust to the challenges and opportunities of electric buses. In Charlotte, that's meant working around hiccups that have taken new BEBs out of service at higher-than-expected rates. In Honolulu, the logistical challenge of scaling up charging operations in tightly-packed depots has meant setting aside more than $10 million for an AI-powered system to do the choreography of matching buses and plugs efficiently.
3. **Invest in Your Workforce.** BEB warranties prohibit transit mechanics from repairing batteries. But that doesn't mean electric buses are entirely low-maintenance. Operating and maintaining BEBs and charging infrastructure require new skills and capacities that transit agencies must prepare for. DOT Low and No Emission Buses funding requires a minimum of 5 percent of funds be used for workforce development. For Charlotte and Honolulu, these investments have provided a springboard for engaging with community colleges and K-12 school systems to grow the future transit workforce.

Links from the Conversation

- U.S. Department of Transportation: Low or No Emission Vehicle Program information page (link)
- Charlotte's Strategic Energy Action Plan (link)
- "Honolulu's TheBus unveils first electric bus", *Mass Transit*, Dec. 17, 2020 (link)

About the Tech and Innovation Center Series (T&IC)

The T&IC series is dedicated to helping local leaders navigate and understand the large quantities of information from the federal government on the nearly 400 funding opportunities available through the Bipartisan Infrastructure Law. The series is focused on how cities can leverage technology to improve their federal infrastructure funding proposals over the next 18 months. Programs will focus on helping cities improve their proposals in response to Notices of Funding Opportunities (NOFO's) by adopting state-of-art technologies, expanding their technology capacity, and integrating aspirational technology "moonshots" for their cities.

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