



WAVE Wireless EV Charging Transforms a California Transit Agency

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In 2014, the Antelope Valley Transit Association (AVTA) leadership set an ambitious goal — to become the first transit operator in the United States to roll out electric bus technology across its entire service area. However, the Los Angeles County agency faced a significant challenge: How to efficiently recharge buses on routes as long as 350 miles.

AVTA serves Antelope Valley in northern Los Angeles County, which extends south into the Los Angeles basin and north to Edwards Air Force Base and the Mojave Air and Space Port. Total annual ridership is more than 2 million commuters, serving 20,000 riders monthly over a total service area of 1,200 square miles.



By December 2020, AVTA's fully-electric, 65-bus, local fixed-route fleet logged its four millionth mile, less than seven years after its first electric bus went into service.¹ Moreover, the agency covered its longest routes with a single electric bus without making changes to its schedules or vehicle count. This was accomplished because of AVTA's decision to use wireless, high-power, in-route charging from WAVE.



AVTA now operates the largest fleet of battery-electric buses (BEBs) in the U.S., and with it, the largest single deployment of high-power, heavy-duty wireless charging in the world.

Having the majority of AVTA's BYD buses equipped for wireless charging gives the agency incredible flexibility. At 250kW, as much as 160 miles of range can be added to a 40-foot bus in a single 8-hour shift. This matches the range of diesel buses, eliminating the need to use multiple BEBs to cover long routes.

The four million electric miles achieved saved 1,025,641 gallons of diesel fuel, a net savings of \$1,283,449 in fuel costs after paying for electricity. Even more impressive, this achievement equates to a carbon footprint reduction of more than 24.3 million pounds of CO₂ and 58,125 pounds of particulate matter.

"Our goal from the start was to be the first transit agency to implement electric bus technology on a broad scale," said AVTA Chairman of the Board Marvin Crist. "We have met that goal."

Faster, Safer, and More Reliable

Within seconds of scheduled stops and natural dwell times, WAVE's solution delivers the high power that medium- and heavy-duty electric vehicles (EVs) need to quickly maximize range extension. Up to 18 miles of range can be added to a 40-foot bus for every 10 minutes of charge time*. Hands-free and requiring no human or mechanical intervention, WAVE charging is safe, efficient, and proven to eliminate the "range anxiety," that is often a barrier to the wide adoption of fleet EVs.

* based on battery consumption of 2.25 kWhr/mi

Rather than cumbersome, high-maintenance plug-in charging or the unsightly complications of overhead systems, WAVE wireless charging simply requires a bus to park on top of the charging pad. When the bus is ready to depart, charging is automatically and safely stopped without any driver intervention required.

Legacy plug-in and overhead chargers demand time-consuming, hands-on operation, clutter the landscape, are susceptible to freezing in cold weather, and need significant maintenance. In comparison, the WAVE system efficiently transfers high power from ruggedized pads embedded in the roadway, over a 5- to 8-inch air gap, to a receiving pad on the vehicle's undercarriage. The system is unaffected by snow, ice, moisture, and heat and is free of moving parts, connectors, or cables.

Leveraging high-power, in-route charging into daily operations frees drivers from concerns over running out of power, while helping to eliminate overnight charging “logjams” at the depot.

Total Cost of Ownership

Besides being simpler and safer, wireless charging is more affordable to operate. In the case of the AVTA, had wireless, in-route charging not been implemented, twenty additional buses would have been required to cover long routes, with battery-depleted vehicles swapped with charged ones in the field. By providing charging opportunities in-route, not only did the agency save millions on additional bus purchases, depot plug-in chargers and associated labor costs, they eliminated the anxiety and stress that goes with managing buses with limited range.

“The electric charging investment made by the AVTA for its zero-emission fleet means that it’s possible to seamlessly complete any route within the authority’s service area,” said AVTA CEO Macy Neshati. “The example we are setting will form a blueprint that any transit agency looking to go completely zero-emission can follow.”

WAVE’s wireless EV charging technology is simple, safe, low maintenance, cost-effective, and has years of field-tested performance. Increased awareness of the benefits of this technology will enable closed-loop systems, such as municipal buses, ports, and depots to transform their polluting fossil-fuel-powered fleets to zero-emissions vehicles. WAVE’s mission is to leverage technology for a cleaner, greener future. With partnerships like the AVTA, we can make meaningful progress to achieve our zero-emissions goals today.

(1) [*AVTA passes new electric vehicle milestone*](#)

