All Electric, All the Time

With Wireless Charging

EV Roadmap

“Beyond the Passenger Vehicle”
Successful Utah State University Spin Out
• $7+M in Commercial Contracts

Delivering Commercial Product

Growing and Addressable Markets

Focused on High Power Heavy Duty Vehicle Applications
WAVE | Why Heavy Duty Focus?

Top NOx Sources in the Region
- Heavy-Duty Diesel Trucks
- Off-Road Equipment
- Maine Vessels
- RECLAIM (Large Stationary)
- Light-Duty Cars & SUVs
- Locomotives
- Aircraft
- Manufacturing and Industrial
- Heavy-Duty Gasoline Trucks
- Medium-Duty Trucks
- Residential Fuel Combustion
- Other
All-Electric Transportation | Market Pain

- Limited Range & Anxiety
- Heavy & Expensive Batteries
- Ugly & Expensive Infrastructure
- Impractical
The Solution | Wireless Power Transfer (WPT)

WAVE Technology:
- Safe charging through road and all-weather conditions
- Simple and cost effective
- Smaller battery packs and unlimited range
- Batteries charged "on the go" throughout route
- Elegant Infrastructure – no cables or overhead wires
En Route Wireless Power Transfer | The Solution

① Vehicle Receives Full Charge Each Night
② Battery Drained as Vehicle Drives Route
③ Vehicle Recharges Wirelessly Throughout Day
④ Vehicle Has Limitless Range
Opportunity Charging | Daily Charging

EV vs. EV with WAVE

Charge Level %

Extended Operating Time
An Elegant Solution | Minimal Footprint

In-ground Primary Charging Pad

Secondary Pad (Mounted Under Vehicle)

Enough Room to Mount WPT Electronics

Secondary Power Electronics Mounted on Bus
1.0 Executive Summary

1.1 Overview

A Wireless Power Transmission (WPT) system has been developed by WAVE for the University of Utah for use in charging a city bus. Testing was conducted on April 29, 2014 to verify and document that the magnetic B field strength emitted by the 50kW wireless shuttle charger does not exceed allowable levels determined by the ICNIRP 2010 and ANSI/AAMI/ISO 14117:2012 standards. Testing took place at the Wave Shuttle Charging Station located at the University of Utah in Salt Lake City, Utah.

This report summarizes the results of the collected data and verifies that no measurements exceeded the maximum allowed values set by either the ICNIRP 2010 or ANSI/AAMI/ISO 14117:2012 standards.

1.3 Synopsis of Findings

The results of the collected data clearly indicate that no measurements exceeded the maximum allowed values set by either the ICNIRP 2010 or ANSI/AAMI/ISO 14117:2012. Total Building Commissioning (TBC), an independent third party testing and commissioning authority verifies that the measurements witnessed are of a consistent and repeatable nature. The test data collected were taken in accordance with the test plan to provide values for the worst case conditions the bus might be charged in.

Average ambient magnetic field values were found to be 0.2 μT. The maximum measured value of 3.7 μT was found during the charging of bus in a misaligned position.

This report is verified and stamped by Commissioning Authority and P.E Ray Dodd.
Traction in Transit | Four Commercial Deployments

- $7.1M in awarded contracts
- Multiple vehicle platforms
- Variable route lengths
- High-profile locations
Next Frontier for WAVE | What’s Next?