

To: Board of Directors

Date: March 9, 2015

From: J. Scott Mitchell  
Director of Maintenance

Reviewed by:

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**SUBJECT: Authorization for the General Manager to direct WAVE Inc. to Proceed with Inductive Charging Infrastructure Engineering for Walnut Creek and Concord Facilities for Support of the Electric Trolley Project**

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**BACKGROUND:** The County Connection Board of Directors has authorized the purchase of four (4) electric trolleys for the Walnut Creek Trolley project. This project will require in-route charging infrastructure in Walnut Creek and at the Concord facility.

**SUMMARY OF ISSUES:** The trolleys are being designed by Gillig with integration and drivetrain provided by BAE Systems. County Connection staff did extensive research on various in-route charging systems for this project. County Connection staff believes that an inductive charging system provided by WAVE Inc. is the best option for this project.

WAVE uses a 50 kw in-ground inductive charger. This will be installed in Walnut Creek. This system provides a wireless power transfer solution. It is fast charging and efficient. It uses an in-ground primary charging pad which provides for minimal infrastructure at the site with no moving parts, making it a very low maintenance system. Using in-route charging allows the vehicle to use smaller batteries and reduces the weight of the vehicle without losing range.

WAVE installed this system at the University of Utah in early 2014. Monterey-Salinas Transit is using WAVE for their electric trolley project. There are plans to use this system in Long Beach, California and McAllen, Texas.

WAVE is an American company and meets all Federal Transit Administration (FTA) Buy America guidelines.

WAVE will work with County Connection to understand the infrastructure requirements for the initial primary in-ground charger. WAVE and County Connection will establish a schedule for infrastructure development (i.e., utility hookup, permitting, etc.) needed to meet the deployment schedule for the Gillig trolleys.

**FINANCIAL:** Cost not to exceed \$1,015,000.

**RECOMMENDATIONS:** Contingent on approval from the FTA, the A&F Committee recommend that the Board of Directors at its March 19, 2015 meeting, adopt a resolution authorizing the General Manager to release a purchase order to WAVE Inc. for the purchase of the WAVE system.



# Enabling Electric Vehicles

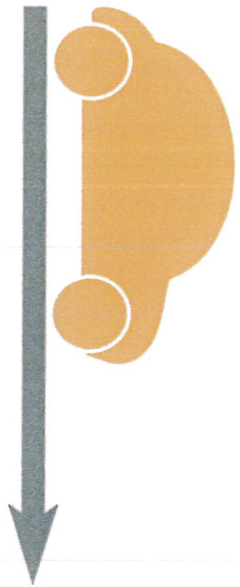
by solving the charging problem

## CCCTA

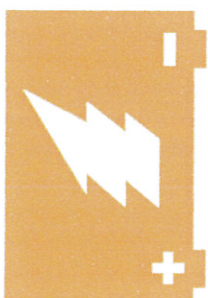
1 WAVE Confidential & Proprietary – Do Not Distribute



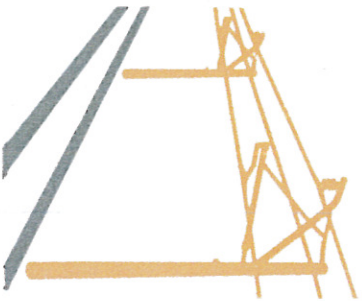
# All-Electric Transportation | Market Pain



Limited Range



Heavy & Expensive Batteries

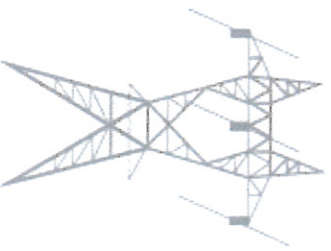


Ugly & High Maintenance

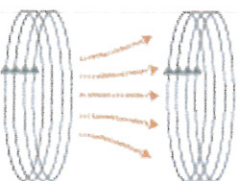


Impractical

# Wireless Power Transfer | The Solution



Electric Grid



Wireless Charger



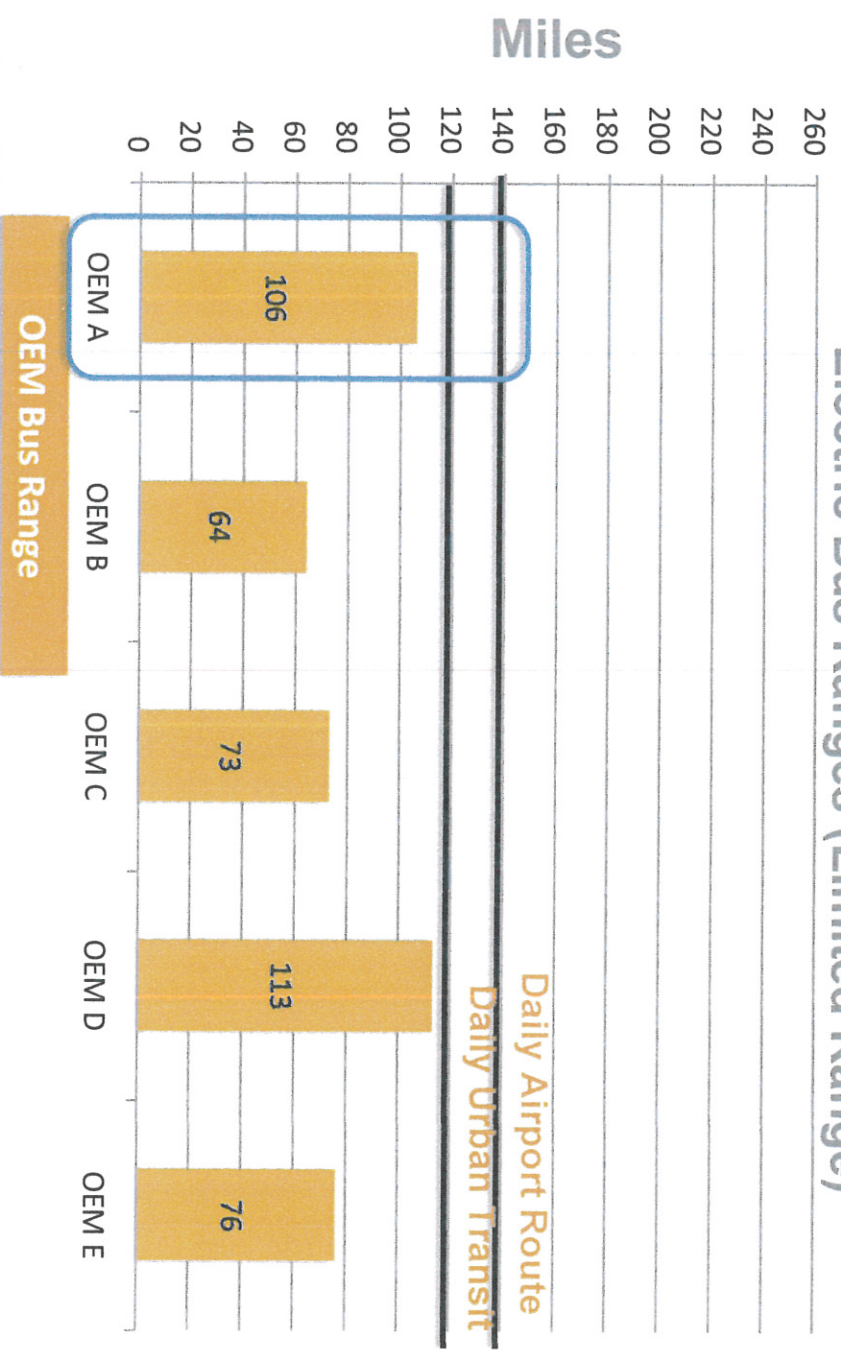
Vehicle

## WAVE Technology:

- ✓ Safe Power Transfer through Road & Weather
- ✓ Fast Charging
- ✓ Large Air Gap – No Mechanical Movement
- ✓ Efficient > 90%

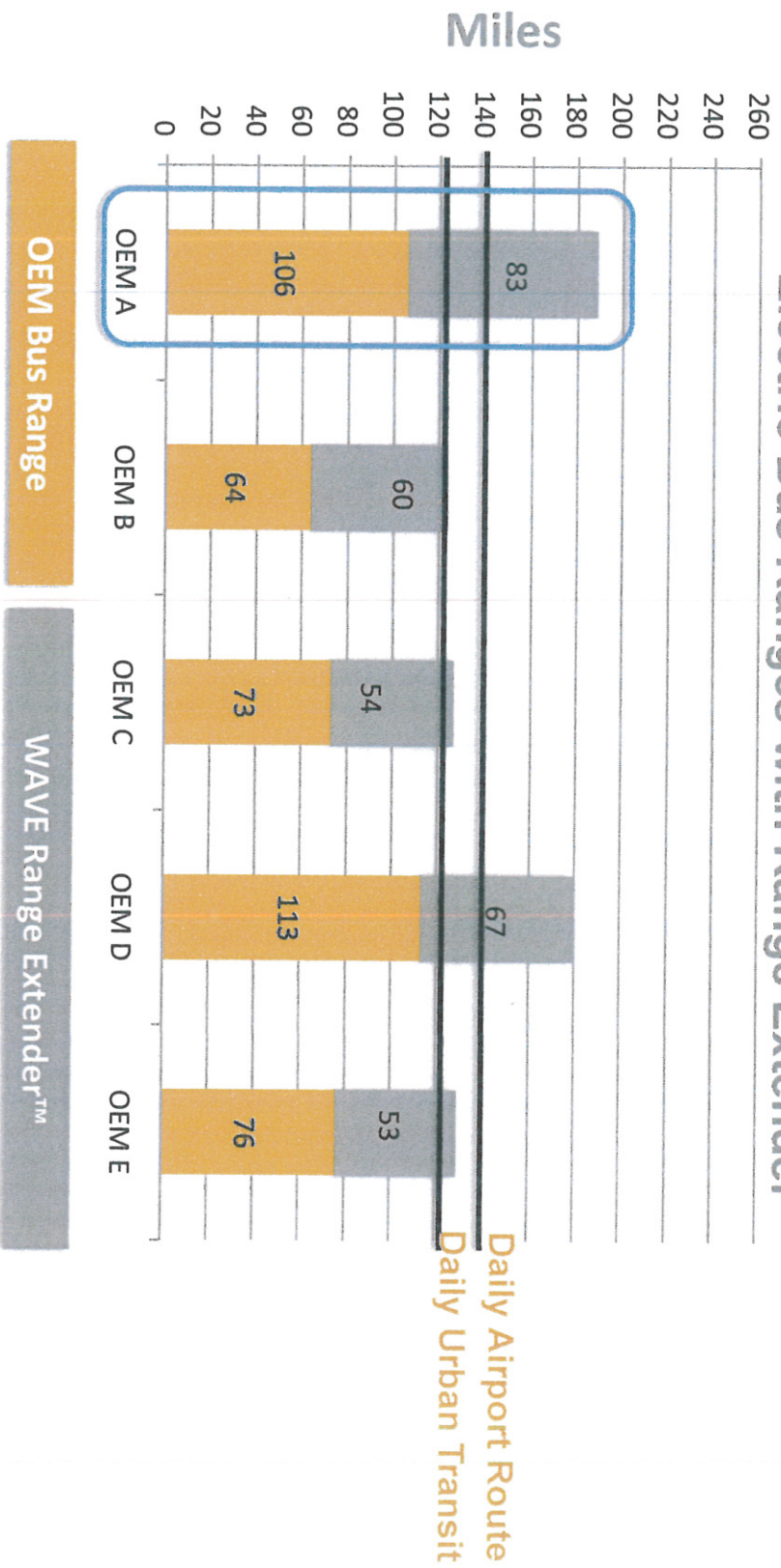
# Electric Buses | Market Pain

Electric Bus Ranges (Limited Range)

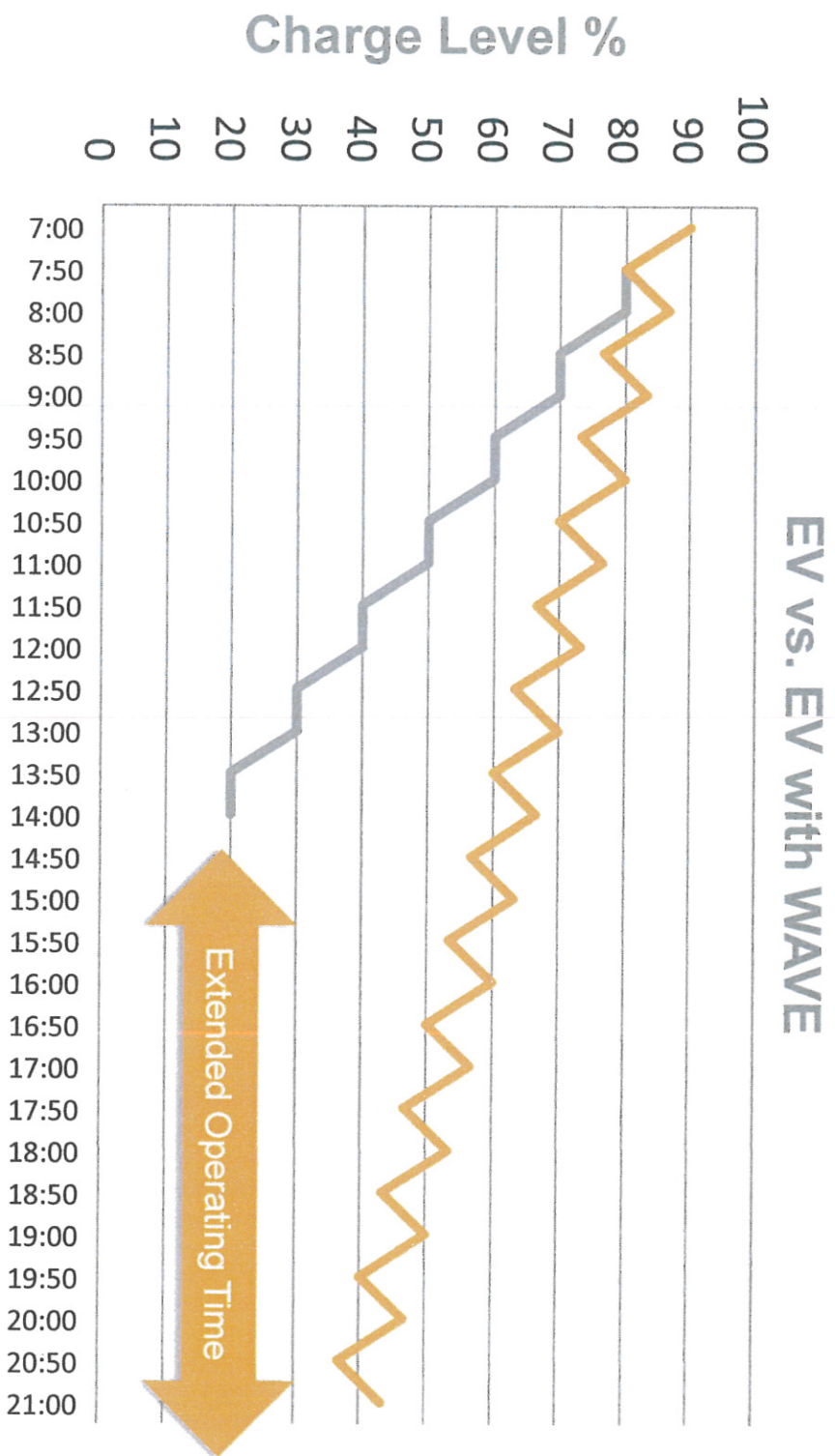


# Range Extender™ | Range Extension – 50 kW

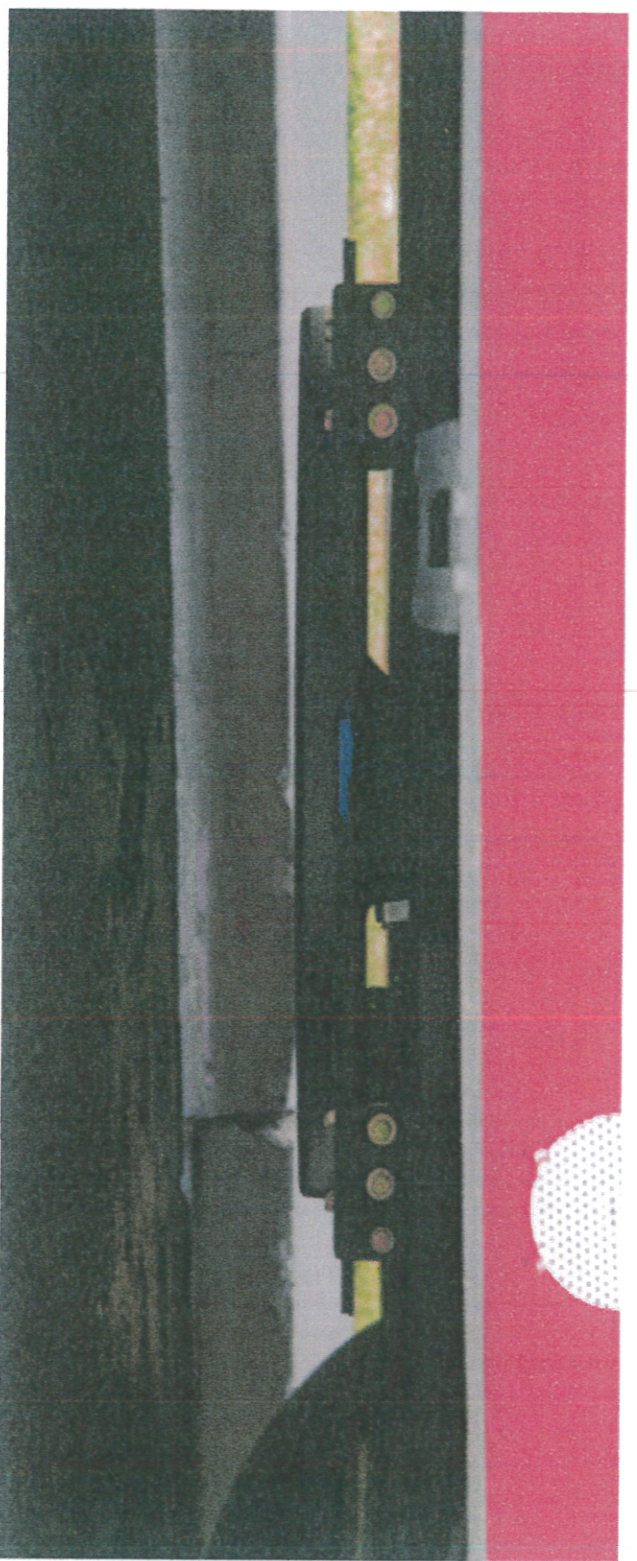
## Electric Bus Ranges with Range Extender™



# Opportunity Charging | Range Extension – 100kW



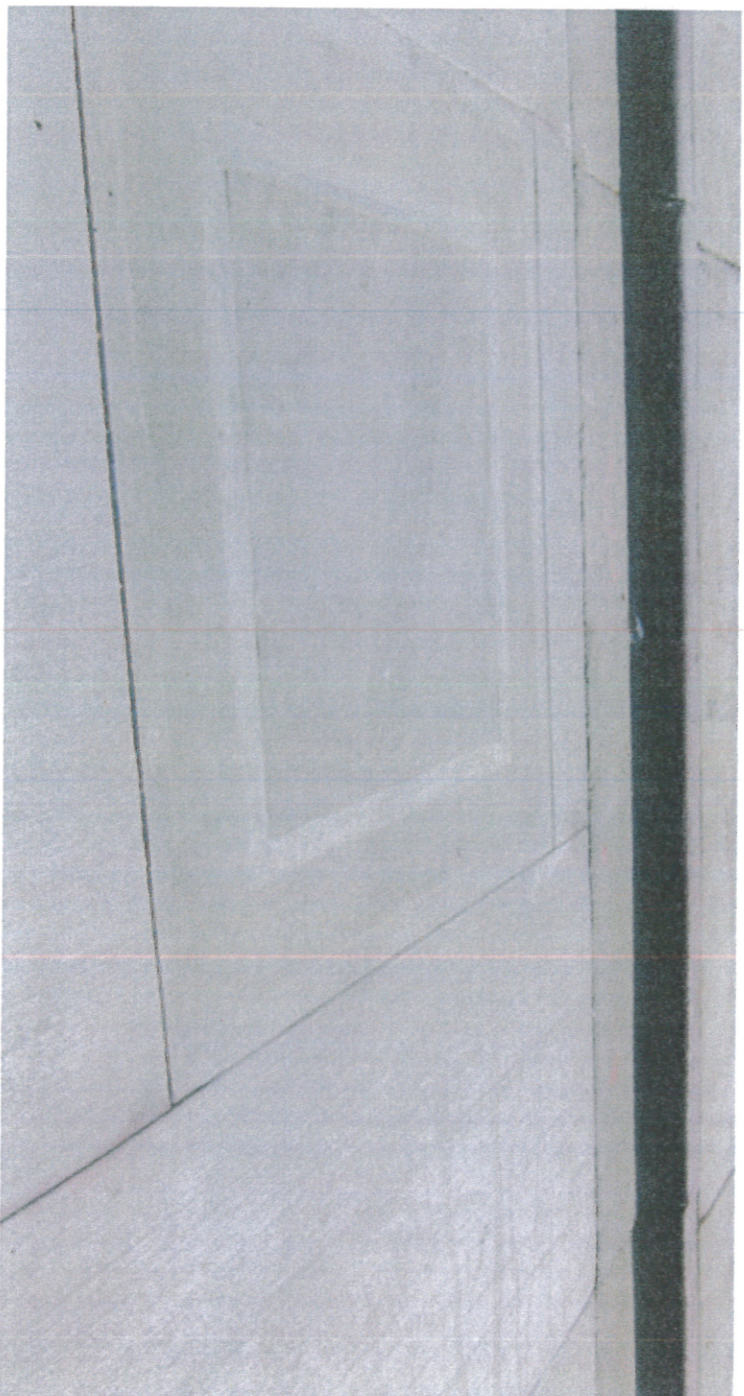
# An Elegant Solution | Minimal Infrastructure on Vehicle



*WAVE's Secondary Pad on Underside of Vehicle*

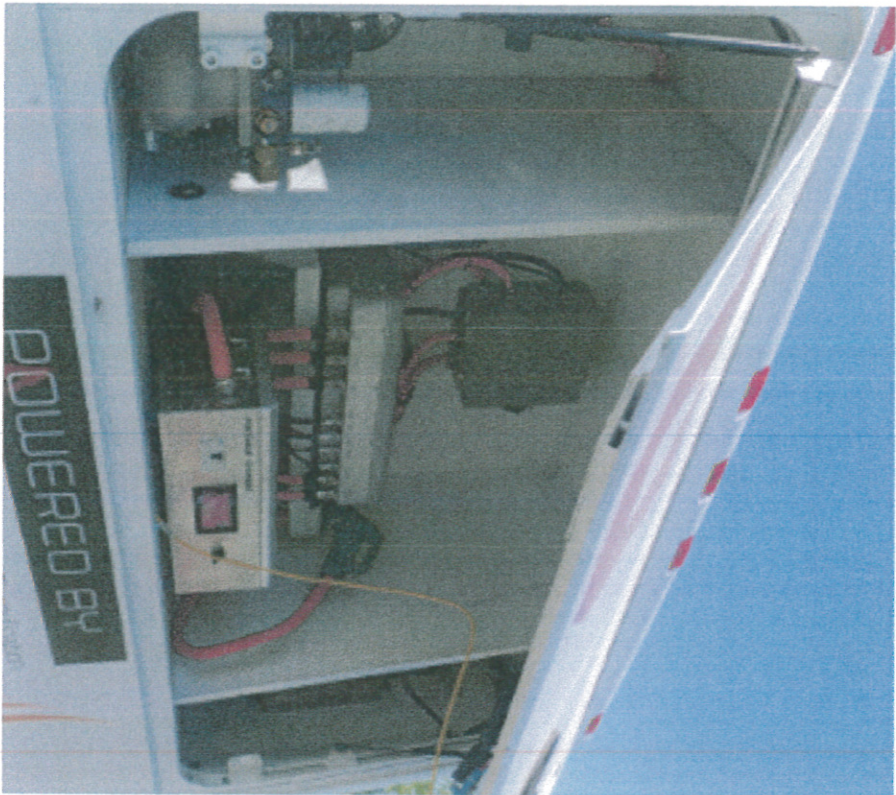


# An Elegant Solution | Minimal Infrastructure on Road



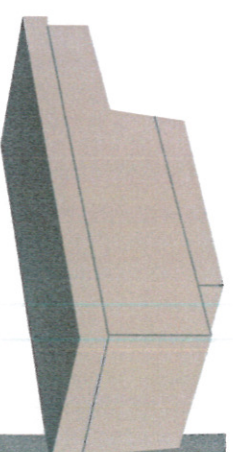
*WAVE's In-Ground Primary Charging Pad*

# An Elegant Solution | Small Footprint on Vehicle

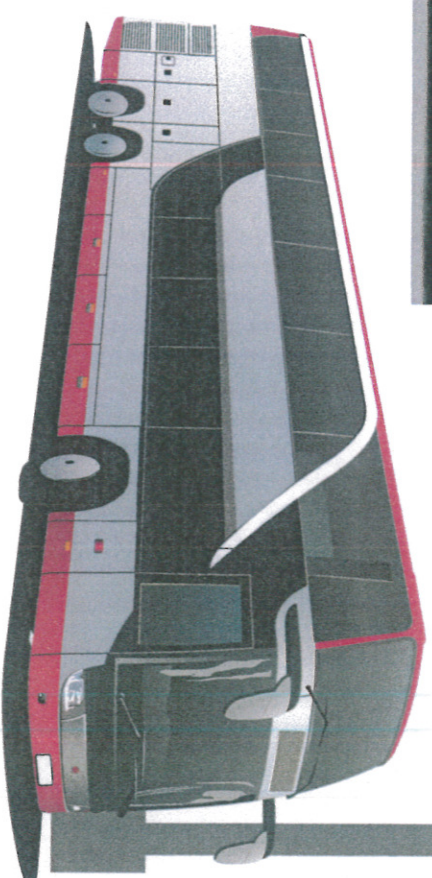


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# Competitive Landscape | Flawed All-Electric Charging Options



- ☑ Large
- ☑ Unappealing
- ☑ Mechanical Failures
- ☑ Long Connection Time



# Utah Transit Authority | First Commercial Deployment

- \$3.2M project, fully-funded
- 50 kW charging system
- Feeder shuttle off of UTA's light rail "TRAX" system
- Operational Q1 2014



Remanufactured All-Electric ZEPS Bus from CCW



Charging System Primary Pad  
(bottom left corner)

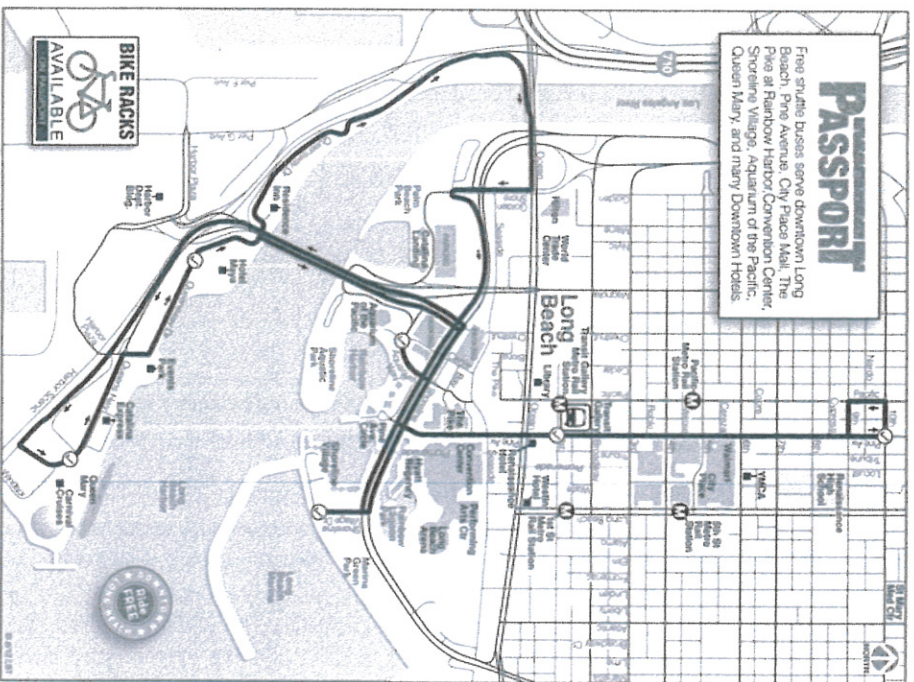
# Monterey Salinas Transit | Waterfront Trolley Route



- \$2.1M project, fully funded
- All-electric trolley replaces current diesel trolley
- 4.5 mile route
- 50 kW charging system (at Aquarium)



# Long Beach Transit Authority | Queen Mary 'Passport' Route



- \$2M project, fully funded
- Downtown Long Beach hotels, convention center, restaurants and attractions
- Two 50 kW charging systems (at the Queen Mary)
- System powers BYD Motors all-electric fleet (10 buses)

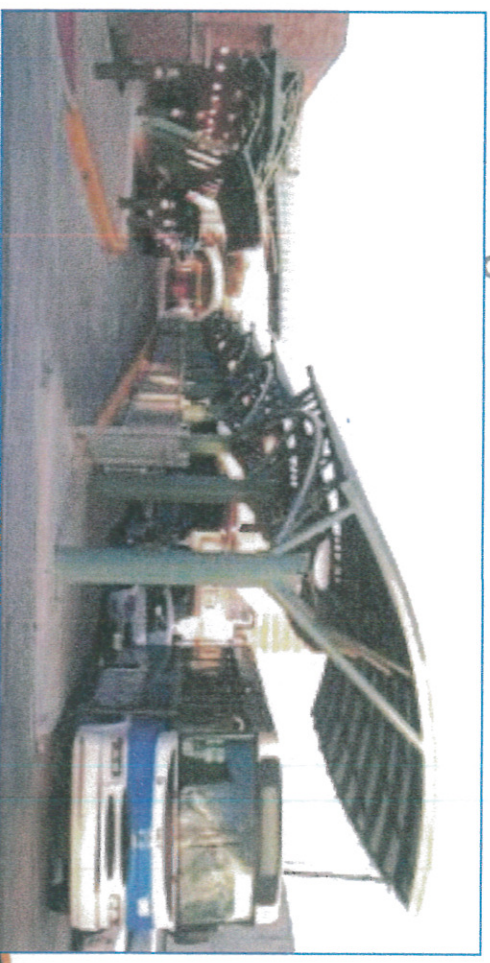


## City of McAllen | A Green Route in Texas

- Prime Contractor of a \$2M project, fully funded
- Route will provide all electric service to the airport, hospital and shopping center
- A 50 kW charging system for two Complete Coach Works “ZEPS” Buses
- Awarded the grant after a competitive bidding process



metro  
McAllen, Texas



# Team



**Michael Masquellier**  
CEO & CTO

Serial entrepreneur and technology expert in wireless, power electronics and sensors with 11 issued and pending patents including Motorola Labs



**Wesley Smith**  
Chief Development Officer

20 years business development and startup experience: Goldman Sachs funded company & JV with IBM Global Solutions



**Guy Letendre**  
Chief Operating Officer

Autoliv Director of Engineering & Airbag Manufacturing Plant, Supply Chain management; B.S. Mechanical Engineering; MBA



**Hunter Wu**  
Chief Scientist

Co-inventor of University of Auckland WPT system; Ph.D Electrical Engineering; Chief Scientist at Utah State University



**John English**  
Director

Former Utah Transit Authority CEO, national leader in transit industry

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