Wireless Power Transfer Technology at ORNL

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SPARK

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ORNL is managed by UT-Battelle
for the US Department of Energy

OAK RIDGE National Laboratory

Our Vision

Provide flexible, efficient, safer, and convenient power distribution with cutting edge wireless energy technology solutions.

Spectrum of Our Wireless Energy Solutions

Automotive

Off highway vehicles

Buildings

Marine Applications

Inductive Coupling

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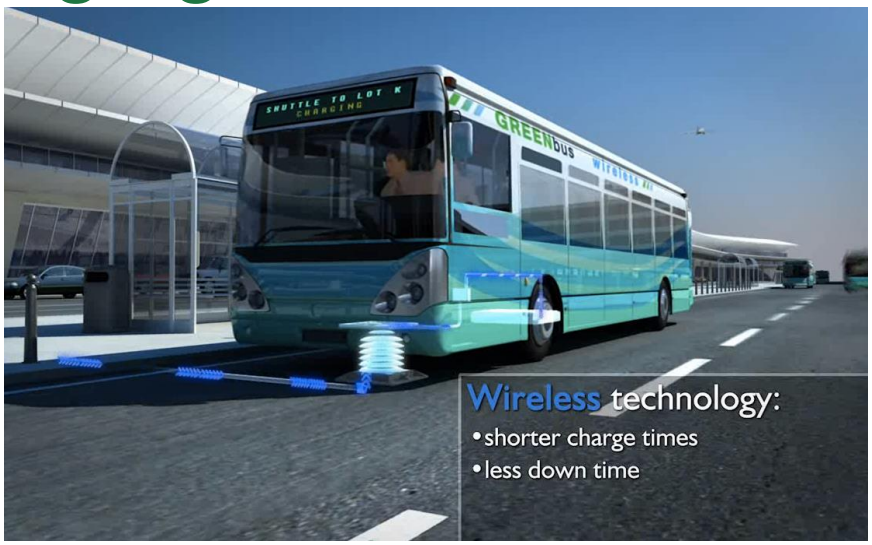
Market Opportunities and Potential:

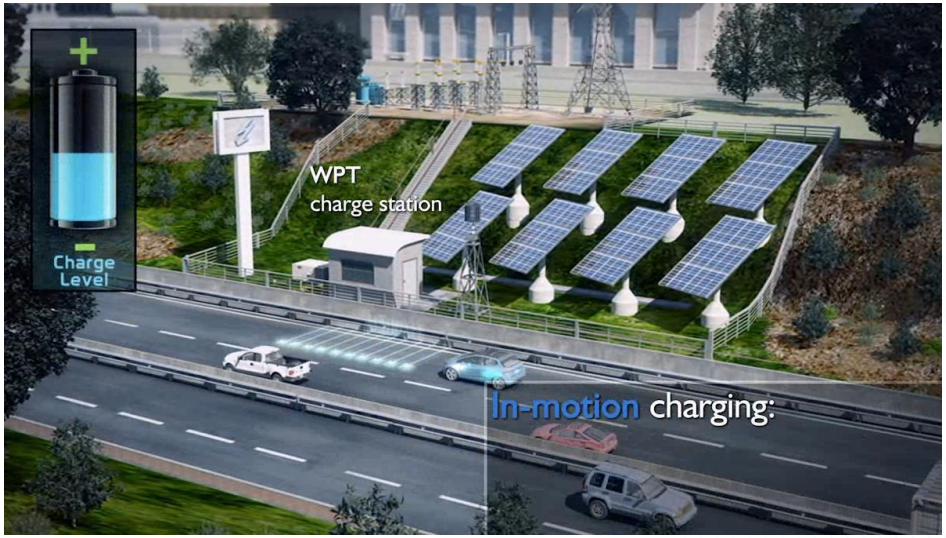
Wireless Charging for Automotive Applications

Automotive Wireless Charging

Stationary Charging



Opportunity/Quasi-Dynamic Charging



In-motion/Dynamic Charging

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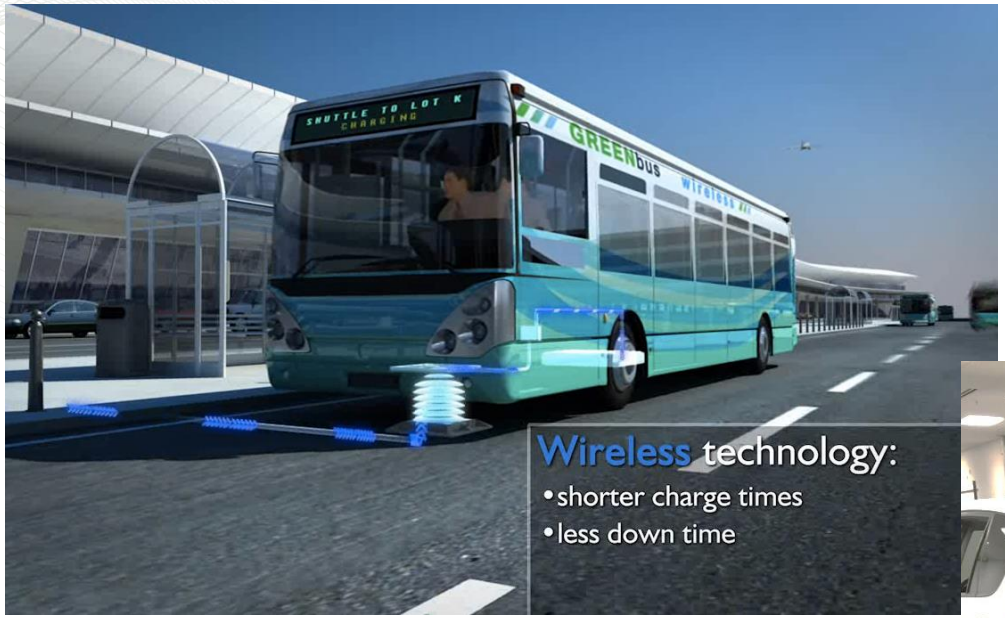
Vehicles Integrated and Tested at ORNL

Chevy Volt	Toyota Prius Plug-in	Scion IQ EV	Toyota RAV4 EV
			

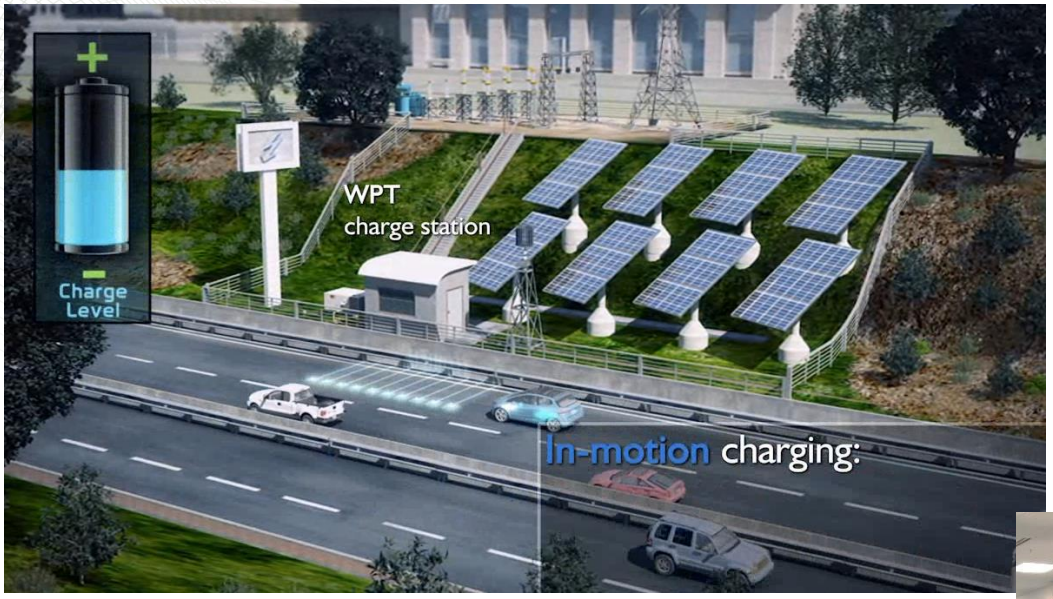
- **Power transfer level (>6.6kW),**
- **Efficiency ~ 90 %**
- **Misalignment tolerant (up to +/- 40mm),**
- **System integration for 7 vehicles**
- **Airgap:162mm**
- ***Met the IEEE and ICNIRP safety standards***

Opportunistic/ Quasi-Dynamic Wireless Charging



- **11 kW bench prototype**
- **20 kW static power -OEM vehicle**
- **Efficiency > 90 %**

In-motion/ Dynamic Charging



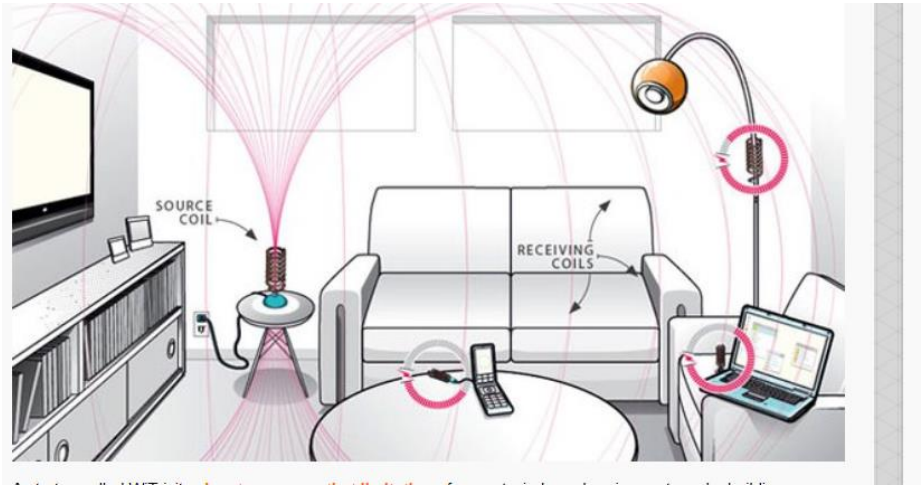
- **Currently, we gain E2=281.08 Watt-seconds (joules) → 0.08 Watt-hours**
- **75% of a highway should we covered with coils with 9.28kW peak power**
- **With 100kW power transfer, only 7.5% of the roadway should be WPT installed.**

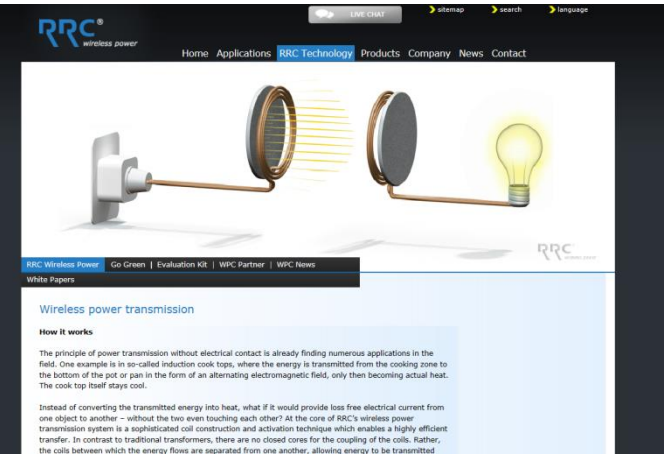
- **Demonstrated up to 3 kW using a GEM vehicle**
- **Demonstrated up to 9 kW using Toyota RAV4**

Market Opportunities and Potential:

Energy Management for Buildings

ORNL vs. Competition





More outlets in building per connection point enabled by portable outlets

ORNL solution is the CAT6 equivalent for power in a house

AMIE- Advance Manufacturing + Integrated Energy

- **Demonstrated bi-directional capability up to 10-kW on a bench top**

- **Demonstrated up to 1 kW with a house load and vehicle charging up to 6.6 kW**

http://www.ornl.gov/amie

Thank you!

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